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MIDDLEMEN'S MARGINS AS A CAUSE OF THE AGRICULTURAL DEPRESSION

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"The increasing spread between farm and retail prices and the increasing violence in the fluctuation of farm prices were a serious problem even before the World War. With deflation, the maladjustment between farm and retail prices has been the most serious single factor in causing the agricultural depression." This is the conclusion reached by Dr. Warren and Dr. Pearson as expressed in the opening statement of their recent bulletin on "Interrelationships of Supply and Price."

About the time this bulletin appeared Dr. Warren, in a paper "Agricultural Readjustment or Legislation" read before the American Farm Economics Association, indicated that he considered the wide spread between farm and retail prices to have been a much more important cause of low farm incomes since the War than the overproduction of farm products. He stated that "it is absolutely essential that we determine which is the major cause of the depression before any intelligent discussion of adjustments, public or private, can be made, because the procedure in each case depends upon the cause. If overproduction is the trouble, reduced production is to be encouraged. If low farm prices are due to the failure of distributing charges to decline, a reduction in the farm output will result in a shortage of food."[1]

[1] "Agricultural Readjustment or Legislation" by G. F. Warren, Journal of Farm Economics, January, 1928.

In a recent review of the above bulletin[2] Dr. Holbrook Working states that "it seems clear that the authors are amply justified in attributing the agricultural depression in large measure to the increase in handling charges, which in turn was at least facilitated by the deflation."

However further analysis of the evidence presented and theories involved in such a conclusion demonstrate why many economists do not accept the above explanation of this agricultural depression.

Causes of Changes in the Margins on Farm Products

Not all changes in the margins on farm products have the same effect on the incomes or prosperity of farmers. The effect depends largely upon the nature or cause of the change in the margin. When consumers buy bread in place of flour, the margin between what consumers pay and farmers receive is increased, but the prices received by farmers for their wheat should not be materially affected by it. If, however, freight rates on potatoes from Presque Isle, Maine, to New York City are increased in September, the prices paid by consumers that year in New York City would not be materially affected since the total supply of potatoes in the United States would remain the same, and farm prices of potatoes in Maine would be reduced by approximately the increase in freight rates. In later years the increase in transportation charges would tend to be shared by consumers and farmers, the exact division depending upon the alternatives of the producers and the consumers; but for a time it would be paid almost entirely by farmers. In general, it may be said that changes in the level of charges for the same distributive services directly affect the incomes and prosperity of farmers; while changes in distributive charges caused by changes in the quantity of distributive services do not.

Now an increase in the relative level of charges for the same distributive services may be caused by a decrease, or slower rate of increase, in the efficiency of distributive agencies compared with that of other productive activities,

[2] Journal of American Statistical Association, December, 1929. p. 441.

or by a slower rate of adjustment in distributive costs than in other lines of production during a period of financial deflation. As for the latter, Dr. Warren and many others before him have pointed out that wages tend to lag behind the general movement of prices during periods of inflation and deflation; and since wages are the most important cost factor in determining freight rates and other handling charges, such charges must lag behind the general movement of prices during such periods. The nature of this lag in wages behind other prices during the recent periods of inflation and deflation is shown in Table 1. The index numbers in this table indicate that the weekly earnings of New York factory workers in 1929 were 142 per cent higher while retail prices of food in the United States were only 74 per cent higher, the cost of living only 72 per cent higher, and wholesale prices of all commodities only 50 per cent higher than their average from 1910 to 1914. In 1918, however, during the period of inflation, the index of earnings shown in this table was only 164 compared with 180 for retail

TABLE I.—INDEX NUMBERS OF WHOLESALE PRICES OF ALL COMMODITIES, AND COST OF LIVING IN THE UNITED STATES, AND OF WEEKLY EARNINGS OF NEW YORK FACTORY WORKERS.

Years	Wholesale prices of all Commodities[1]	Retail prices of food in U. S.[2]	Cost of Living in U. S.[3]	Weekly earnings of New York factory workers[4]
1913	102	103	104	
1914	100	106	104	101
1915	103	107	102	104
1916	129	117	112	116
1917	180	156	131	132
1918	198	180	160	164
1919	210	194	182	190
1920	230	207	212	227
1921	150	163	180	207
1922	152	150	168	202
1923	157	154	172	220
1924	152	153	170	223
1925	162	169	175	228
1926	154	174	176	234
1927	149	169	173	236
1928	151	170	171	237
1929	150	174	172	242

* Farm Economics, March 1930 and February 1929.

[1] United States Bureau of Labor Statistics index of wholesale prices of all commodities is converted to the five year base, 1910-1914 equals 100, by multiplying the new index of 550 base by 1.55.

[2] United States Bureau of Labor Statistics.

[3] The index numbers for December and June are those published by the United States Bureau of Labor Statistics. Intervening months bear the same ratio to these figures that Synder's index for the intervening months bears to his figures for June and December. Both index numbers use 1913 as 100, but Synder's shows that the five year period, 1910-1914 also averages 100.

[4] Data furnished by the Department of Labor of New York. Union wage rates in 1914 are 101 when 1910-1914 equals 100. Weekly earnings for 1914 are therefore considered as 101, to make the other index numbers on the 1910-1914 base.

prices of food, 160 for cost of living, and 198 for wholesale prices of all commodities.

There does not, however, appear to be any sign of adjustment taking place between these index numbers of earnings and other prices since the drop of prices in 1920 and 1921. In fact the cost of living and wholesale prices of all commodities appears to have been on about the same level in 1929 as in 1922, while the index of retail food prices shows an increase of only 24 points or 16 per cent during this period compared with an increase of 40 points or 20 per cent for the earnings of New York factory workers.

These index numbers, however, may not accurately reflect the movement of wages and prices during this period. Or it may be that wages are now on a more or less permanently higher level with respect to the general level of food and other prices. Although wages paid by distributors are now higher, it may be that this has been offset in large part by an increase in the efficiency of distributive agencies. Transportation rates on many farm products, for instance, are only a little higher relative to wholesale prices of all commodities than before the War, as shown by the following index numbers of freight rates in 1927 computed by the United States Department of Agriculture for important farm products with 1913 as a base:

Livestock	157
Wheat	149
Cotton	165
All commodity wholesale price index	149

Apparently the railroads are operating more efficiently in terms of labor and otherwise than before the war, since wages represent a large part of the costs of transportation. Improvements in other lines of marketing activity may in similar manner be off-setting the effect of distributive charges. Motor trucks have probably decreased the amount of labor required in distributing goods from wholesalers to retailers since 1910. Perhaps an increase in the average size of business of distributive agencies or the development of chain store methods of distribution, have exerted some influence in the reduction of charges for distributing farm products.

As for the other major factor in widening margins, an increase in the total quantity of distributive services per unit of farm products, this may be caused by a much wider range of economic developments. In recent years specialization in agriculture, concentration of population in particular localities, and the demand of consumers for more credit, more delivery service, and more processing and packaging of food products, have probably caused such an increase. As large cities, such as New York City, Boston and others from which the United States Bureau of Labor obtains its retail prices of food products, increase in size they must draw their food supplies from an ever widening area with increasing transportation costs. Food prices and the cost of living in these cities are generally known to be higher than in smaller towns. Yet these cities[3] increased *25.7* per cent in population from *1910* to *1920* compared with *11* per cent for the rest of the United States. Apparently wages are high enough in these cities to offset any resulting increase in distributive charges for food and other living expenses compared with places closer to the food supply where living expenses are lower. More distributive service is involved in furnishing food to people in these cities, and wages of part of the labor employed in supplying it are higher. Improvements in transportation and storage may increase the spread between farm and retail prices, by causing form products to be hauled farther or stored longer without raising prices to consumers.

Similarly, specialization in agricultural production, and localization of production of any product in specially favored areas, are likely to increase distribution costs; but the increase is more than offset by savings in cost of production. The income of farmers should be increased rather than reduced by such developments.

Any increase in charges for distributing farm products caused by consumers demanding more credit, or deliveries, or more processing of food must obviously be paid by consumers for the most part. It would appear, therefore, that if Dr. Warren's contention that higher distributive

[3] The 39 cities from which the United States Bureau of Labor Statistics collected retail prices of food continuously from 1913 to date. Twelve other cities have been added to this list since 1913 but are not included in the calculation of this percentage.

margins have been the major cause of the post-war agricultural depression these higher margins must take the form of a higher level of charges per unit of distributive services. Let us therefore try to analyze changes in margins for the same distributive services.

Evidence of Increased Margins on Farm Products Since the War

Most of the evidence needed for such an analysis has been worked out by Dr. Warren and Dr. Pearson, and presented in the bulletin above mentioned, "Interrelationships of Supply and Price." This evidence can be studied best by commodities.

For potatoes, the data given are the retail and wholesale prices in New York City and farm prices at Batavia, New York, together with an index of margins between an average of United States farm prices and retail prices in certain large cities of the United States as published by the United States Bureau of Labor Statistics. These data are shown in Table 2.

The retail prices used for New York City are those published by the United States Bureau of Labor Statistics. The wholesale prices are straight averages of average monthly prices from October to June obtained by averaging high and low weekly price quotations for New York City as published in the Saturday issues of the Producers' Price Current. The farm prices at Batavia, New York, were obtained from one produce firm and its predecessors for a period of 32 years. They are straight averages of average monthly prices from October to May inclusive, or one month, June, less than for the retail or wholesale prices used.

None of the prices in Table 2 as published in the bulletin have been deflated.[4] The same is true of many of the others shown in this bulletin, although in an introductory paragraph of the bulletin the statement is made that "the word 'price' is used throughout this publication as synonymous with 'purchasing power.'"

[4] Inspection of the potato prices in Table 2 will indicate that they have not been deflated. If other evidence is needed, it will be found that the wholesale prices for New York City shown in this table are the same for the years 1910 to 1919 inclusive and 1925 as the undeflated series reported in the United States Department of Agriculture Yearbook for 1927.

TABLE 2.—MARGINS BETWEEN FARM, WHOLESALE, AND RETAIL POTATO PRICES

Crop Year	*Potato Prices* in Dollars Per Bushel*			*Margin* in Dollars per Bushel						
	New York City Retail*	New York City Wholesale*	Batavia N. Y. Farm*	N. Y. Retail and Batavia farm prices		N.Y. Wholesale and Batavia farm prices		N. Y. Retail and N. Y. wholesale prices		Cornell index margins between U. S. Retail price and U. S. Farm price*
				Actual	Deflated	Actual	Deflated	Actual	Deflated	1910–1914 = 100
1910–11	1.38	.54	.39	.99	1.04	.15	.16	.84	.89	104
1911–12	2.04	1.06	1.01	1.03	1.05	.05	.05	.98	1.00	121
1912–13	1.44	.62	.47	.97	.95	.15	.15	.82	.81	113
1913–14	1.50	.78	.65	.85	.85	.13	.13	.72	.72	91
1914–15	1.14	.47	.29	.85	.85	.18	.18	.67	.67	77
1915–16	1.68	1.03	.89	.79	.68	.14	.12	.65	.56	82
1916–17	3.36	2.38	2.32	1.04	.64	.06	.04	.98	.60	123
1917–18	2.22	1.29	.83	1.39	.73	.46	.24	.93	.49	169
1918–19	2.52	1.27	1.03	1.49	.73	.24	.12	1.25	.61	140
1919–20	4.26	2.84	2.35	1.91	.81	.49	.21	1.42	.60	175
1920–21	2.10	.94	.55	1.55	.91	.39	.23	1.16	.68	294
1921–22	2.46	1.16	.98	1.48	1.02	.18	.12	1.30	.90	152
1922–23	1.92	.94	.60	1.32	.83	.34	.21	.98	.62	160
1923–24	2.22	1.08	.71	1.51	.99	.37	.24	1.14	.75	164
1924–25	1.74	.70	.39	1.35	.85	.31	.19	1.04	.65	173
1925–26	3.66	2.38	2.16	1.50	.95	.22	.14	1.28	.81	206
1926–27	2.64	1.66	1.03	1.61	1.08	.63	.42	.98	.66	248

* Source—"Interrelationships of Supply and Price" page 20, Table 8 and page 99, Table 121.

When deflated in terms of the wholesale price index it appears that the margin between Batavia farm prices and retail prices in New York City was practically the same from 1922 to 1926 as from 1910 to 1914 inclusive. For the early period the average was 94.8 cents and for the later period 94.0 cents. There was, however, a slight decline during the war period. The margin between Batavia farm and New York wholesale prices, on the other hand, increased during the war period and remained on about the same high level from 1921 to 1926. The margin between the wholesale and retail prices in New York City, however, declined during the war and has remained low since 1920.

But there is a marked difference between these changes in the margin between potato prices in one producing and one consuming area, and the changes in margin between farm and retail prices for the United States as a whole as indicated by the Index numbers shown in the last column of Table 2. This latter index stood at 248 for the crop-year 1926-1927, while the United States Bureau of Labor wholesale price index for 1926 stood at 154. If now the margins between Batavia farm and New York City whole-

TABLE 3.—MARGINS BETWEEN FARM, WHOLESALE, AND RETAIL PRICES OF CORN AND CORNMEAL

Crop year Nov.–Oct.	Farm price of corn in Iowa[1]	Price of No. 3 Yellow corn at Chicago[2]	Margin between Iowa Farm and Chicago wholesale price of Corn		Margin between price or cornmeal in straight carload lots at Utica, N. Y. and Iowa farm price of corn.[3]		Cornell Index of margin between retail price of cornmeal and farm price of corn in United States.[4] 1910–1914 = 100
			Actual	Deflated	Actual	Deflated	
	Dollars per Bushel	*Dollars per Bushel*	*Dollars per Bushel*		*Dollars*	*Dollars*	
1909	.51	.60	.09	.09	.77	.74	—
1910	.44	.55	.11	.12	.71	.75	97
1911	.61	.70	.09	.09	.91	.91	97
1912	.48	.58	.10	.10	.78	.77	101
1913	.62	.70	.08	.08	.90	.90	103
1914	.65	.73	.08	.08	.92	.91	103
1915	.66	.77	.11	.09	.91	.75	109
1916	1.28	1.49	.21	.12	1.74	1.00	111
1917	1.33	1.71	.38	.20	2.01	1.03	178
1918	1.44	1.58	.14	.07	1.92	.93	223
1919	1.32	1.54	.22	.09	1.98	.84	196
1920	.44	.61	.17	.11	1.00	.63	214
1921	.44	.58	.14	.09	.85	.57	189
1922	.67	.81	.14	.09	1.10	.70	155
1923	.77	.89	.12	.08	1.21	.80	145
1924	.97	1.09	.12	.07	1.40	.87	167
1925	.61	.76	.15	.10	1.06	.68	197
1926	.71	.84	.13	.09	1.16	.78	209
1927	.83	.98	.15	.10	1.28	.84	206
1928	.77	.93	.16	.10	1.22	.80	—

[1] U.S.D.A. Statistical Bulletin No. 15 page 109, Table 43 and Crops and Markets.
[2] U.S.D.A. 1928 Yearbook page 714, Table 60 and Crops and Markets.
[3] Farm Economics.
[4] "Interrelationships of Supply and Price," page 99, Table 121.

sale and retail prices from 1910 to 1926 shown in Table 2, can be taken to represent the actual changes in charges for the same distributive services for the country as a whole, then practically all of the increase in margin between farm and retail prices for the United States as a whole indicated by the above indices must have resulted from a shift in the relation of producing and consuming areas or other changes affecting quantity of service. Such a shift need not reduce farm incomes.

Some indications of the trend in margins between farm, wholesale and retail prices of corn and wheat or their products, are shown in Tables 3 and 4. Margins between the simple averages of monthly farm prices of corn in Iowa and wholesale prices of No. 3 yellow corn in Chicago, shown in Table 3, have been somewhat lower, in terms of 1910-1914 dollars, since 1920 than before or during the war. The margin between farm prices of corn and retail prices of cornmeal, mainly for human consumption, in the United States

TABLE 4.—MARGIN BETWEEN FARM AND WHOLESALE OR RETAIL PRICES OF WHEAT AND WHEAT PRODUCTS

Crop Year July–June	Farm prices of wheat in Kansas[1]	Prices of No. 2 Red Winter Wheat at Chicago[2]	Margin between Kansas farm and Chicago wholesale price of wheat		Cornell Index of margin between farm price of wheat and retail price of wheat flour and wheat bread in the United States. 1910–1914 = 100[3]	
			Actual	Deflated		
	Dollars per Bushel	*Dollars per Bushel*	*Dollars per Bushel*	*Dollars per Bushel*	*Flour*	*Bread*
1909	.98	1.14	.16	.15	—	—
1910	.84	.96	.12	.12	97	—
1911	.91	1.00	.09	.09	97	—
1912	.78	1.01	.23	.23	104	—
1913	.79	.93	.14	.14	106	97
1914	1.08	1.26	.18	.18	101	109
1915	.97	1.16	.19	.17	112	114
1916	1.76	1.93	.17	.11	117	119
1917	2.07	2.21	.14	.07	169	134
1918	2.09	2.34	.25	.12	150	145
1919	2.22	2.49	.27	.12	170	148
1920	1.59	1.99	.40	.21	210	177
1921	1.06	1.27	.21	.14	195	175
1922	.96	1.23	.27	.17	175	155
1923	.92	1.08	.16	.10	165	158
1924	1.35	1.67	.32	.20	158	155
1925	1.48	1.69	.21	.13	174	153
1926	1.21	1.39	.18	.12	185	158
1927	1.25	1.51	.26	.17	184	164
1928	.93	1.35	.42	.28	—	—

[1] U.S.D.A. Statistical Bulletin No. 15, page 187, Table 78 and Crops and Markets. Simple averages of monthly prices.
[2] U.S.D.A. 1926 Yearbook, page 819, Table 22 and Crops and Markets. Simple averages of monthly prices.
[3] "Interrelationships of Supply and Price" page 99, Table 121.

as a whole, as measured by the Cornell Index, was about the same as before the war from 1922 to 1924, but considerably higher from 1925 to 1927 inclusive. The use of cornmeal for human consumption, however, is an insignificant market for corn grown in the United States. Probably more cornmeal is purchased for feeding to livestock than for human consumption. In any case, the margin between a simple average of monthly prices of cornmeal in straight carload lots at Utica, New York, as published in "Farm Economics", and the above farm prices of corn in Iowa, have been slightly lower from 1924 to 1928 than from 1909 to 1913, as shown in Table 3. And the margin between Iowa farm prices and the prices actually paid by farmers in New York State may have declined even more, because of the development of large-scale cooperative buying, the introduction of motor trucks and other improvements in marketing facilities.

The margin between farm prices of wheat in Kansas and wholesale prices of No. 2 red winter at Chicago has been

about the same since 1920 as from 1909 to 1913, in terms of 1910 to 1914 dollars, as shown in Table 4. Margins between farm prices of wheat and retail prices of wheat flour and wheat bread in the United States as measured by the Cornell Index, however, have been somewhat higher since 1920 than before the war, especially for wheat flour. This difference in trend of margins for wheat flour and bread shown by these index numbers has probably resulted in large measure from greater improvement in the manufacturing and marketing of bread than of flour in the recent years. It is also significant as an indication of the influence that manufacturing and marketing developments may have on distributing charges.

An interesting illustration of the difference in trend of margins between wholesale prices of wheat in Chicago and farm prices in Kansas and Minnesota since 1890 is shown by the following data:[5]

Period	Minnesota farm price of wheat per bushel Dec. 1	Chicago wholesale price of No. 1 spring wheat per bushel (Crop year)	Difference	Difference in terms of 1910–1914 dollars.*
1890–1900	$0.619	$0.740	$0.121	$0.158
1901–1913	0.792	0.977	0.185	0.200
1921–1926	1.138	1.433	0.295	0.191

	Kansas farm price of wheat per bushel Dec. 1	Chicago wholesale price of No. 2 red winter wheat per bushel (Calendar year)		
1890–1900	$0.570	$0.759	$0.189	$0.247
1901–1913	0.758	0.932	0.174	0.188
1921–1926	1.128	1.432	0.304	0.197

* Average differences in price for each period were divided by the average index of wholesale prices, with 1910–14 as a base, for each period respectively.

In both comparisons, the margin for the period from 1921-1926 is about the same as for the period from 1901-1913 in terms of 1910-1914 dollars. From 1890 to 1900, however, the margin for Minnesota was somewhat lower and for Kansas considerably higher than in either of the later periods. It would be difficult to say whether or not these

[5] The original data for Minnesota and Kansas farm prices and for Chicago wholesale prices were taken from Tables 68 and 69 of "Interrelationship of Supply and Price."

TABLE 5.—MARGIN BETWEEN IOWA FARM AND CHICAGO WHOLESALE PRICES OF HOGS AND CHICAGO RETAIL PRICES OF PORK PRODUCTS

Year	Iowa farm price of hogs[1]	Chicago wholesale price of hogs[2]	Margin between Iowa farm and Chicago wholesale prices		Chicago retail prices of pork products[3]	Margin between Chicago retail and Iowa farm prices		Cornell index of margin between farm prices of hogs and retail prices of pork products in United States 1910–1914 = 100[4]
			Actual	Deflated		Actual	Deflated	
	Dollars per cwt.	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	
1910	8.22	8.90	.68	.66	—	—	—	86
1911	6.17	6.73	.56	.59	—	—	—	99
1912	6.93	7.56	.63	.62	—	—	—	100
1913	7.72	8.34	.62	.61	22.63	14.91	14.65	107
1914	7.71	8.31	.60	.60	22.96	15.25	15.27	110
1915	6.54	7.11	.57	.56	22.38	15.84	15.44	112
1916	8.76	9.54	.78	.60	24.26	15.50	12.02	115
1917	14.68	15.58	.90	.50	32.95	18.27	10.13	136
1918	16.53	17.58	1.05	.53	40.43	23.90	12.09	181
1919	16.95	18.10	1.15	.55	44.34	27.39	13.04	214
1920	13.18	14.10	.92	.40	42.61	29.43	12.78	237
1921	7.59	8.51	.92	.61	34.44	26.85	17.95	223
1922	8.58	9.29	.71	.47	32.49	23.91	15.78	201
1923	6.93	7.60	.67	.43	31.25	24.32	15.54	205
1924	7.46	8.18	.72	.47	31.62	24.16	15.85	203
1925	11.18	12.03	.85	.53	37.22	26.04	16.12	213
1926	11.67	12.39	.72	.47	39.42	27.75	18.05	222
1927	9.49	10.00	.51	.34	37.30	27.81	18.66	226
1928	8.77	9.53	.76	.50	35.58	26.81	17.52	—

[1] U.S.D.A. Statistical Bulletin No. 15 page 117 and Crops and Markets.
[2] U.S.D.A. 1928 Yearbook page 930, table 383 and Crops and Markets.
[3] Retail prices published by Bureau of Labor Statistics for Chicago were weighted as follows: Pork chops 36, Lard (Prices are for New York) 34, Ham 22, and Bacon 17. These are the weghts used by Warren and Pearson.
[4] "Interrelationships of Supply and Price" page 99, Table 121.

changes in margins represent actual changes in costs, especially since December 1 farm prices are compared with an average of wholesale prices for the crop year in one case and for the calendar year in another.

Similar comparisons of farm, wholesale and retail prices of hogs and beef cattle or their products, are shown in Tables 5 and 6. From 1910 to 1928 the margin between Iowa farm and Chicago wholesale prices of hogs has steadily declined, in terms of 1910-1914 dollars as shown in Table 5. From 1924 to 1928, the average was 46.2 cents per hundred pounds compared with an average of 61.6 cents from 1910 to 1914. The margin between retail prices of hog products in Chicago and Iowa farm prices, however, has been slightly higher since 1920, and especially since 1925, than during 1913 and 1914, the earliest data available. This increase may easily have resulted from a larger proportion of retail deliveries, more credit to consumers, smaller retail purchases, or a change in the quality of hogs represented by each price series. In any case, the average margin in terms of

TABLE 6.—MARGIN BETWEEN IOWA FARM AND CHICAGO WHOLESALE PRICES OF BEEF CATTLE AND RETAIL OF RIB ROASTS AND ROUNDS

Year	Iowa farm price of Cattle[1]	Chicago wholesale price of Cattle[2]	Margin between Iowa farm and Chicago wholesale prices		Chicago retail prices of Beef Products[3]	Margin between Iowa farm price of cattle and Chicago retail price of Beef Products		Cornell Index of margin between farm price of Cattle and retail price of Beef Products in United States. 1910–1914 = 100[4]
			Actual	Deflated		Actual	Deflated	
	Dollars per cwt.	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*	
1910	5.34	6.80	1.46	1.42	—	—	—	84
1911	5.03	6.40	1.37	1.45	—	—	—	93
1912	6.23	7.75	1.52	1.51	—	—	—	103
1913	7.04	8.25	1.21	1.19	19.86	12.82	12.59	109
1914	7.36	8.65	1.29	1.29	21.51	14.15	14.16	111
1915	6.97	8.40	1.43	1.39	21.66	14.69	14.32	110
1916	7.79	9.50	1.71	1.33	22.25	14.46	11.21	114
1917	9.80	11.60	1.80	1.00	24.95	15.15	8.40	127
1918	11.78	14.65	2.87	1.45	30.96	19.18	9.70	178
1919	12.35	15.50	3.15	1.50	32.86	20.51	9.76	186
1920	10.23	13.30	3.07	1.33	35.00	24.77	10.76	209
1921	6.44	8.20	1.76	1.18	30.57	24.13	16.13	212
1922	6.92	8.65	1.73	1.14	28.97	22.05	14.55	194
1923	7.34	9.40	2.06	1.32	31.35	24.01	15.34	200
1924	7.43	9.24	1.81	1.19	31.85	24.42	16.02	205
1925	8.52	10.16	1.64	1.02	33.86	25.34	15.69	202
1926	8.00	9.47	1.47	.96	35.44	27.44	17.85	208
1927	8.99	11.36	2.37	1.59	36.40	27.41	18.40	206
1928	10.93	13.91	2.98	1.95	41.35	30.42	19.88	—

[1] U.S.D.A. Statistical Bulletin No. 15, page 116 and Crops and Markets. Simple averages of monthly prices.
[2] U.S.D.A. 1928 Yearbook page 913, Table 360.
[3] Retail prices in reports of the Bureau of Labor Statistics for Chicago are easily available only for rib roast and round cuts of beef. These are given equal weights since the weights used by Warren and Pearson are as follows: Sirloin steak, 32; round steak, 32; rib roast, 31; chuck, 31; plate beef, 60.
[4] "Interrelationships of Supply and Price" page 99, Table 121.

current value of money from 1921 to 1927 is only 172 per cent of the average in 1913 and 1914, compared with an average of 196 per cent for margins between average United States farm products as measured by the Cornell index for the same periods. Most of this increase in distributive margins above the general level of wholesale prices therefore seems to be due to an increase in the quantity of distributive services.

The trend in the margins for beef cattle from 1910 to 1928 are very much the same as for hogs. The increase in margins between Iowa farm price and retail prices in Chicago from 1910 to 1928 is a little greater than for hogs, and that between average United States farm prices and average United States retail prices is somewhat smaller than for hogs. This difference may be due to the fact that the retail prices used are only for rib roast and round cuts of beef.

Unfortunately, representative farm wholesale and retail prices of dairy products are not available for the United States. In working out the cost of distributing butter, Dr. Warren and Dr. Pearson, therefore, used the margin between Minnesota farm prices and average retail prices in the United States as published by the United States Bureau of Labor Statistics. An index of these margins as shown in Tables 7 and 9 indicates that margins on distributing butter in the United States have since 1920 been on about

TABLE 7.—MARGINS BETWEEN FARM AND RETAIL PRICES OF BUTTER, 1912–1928

Year	Margin between farm prices in Wisconsin[1] and retail prices in Chicago[2]			Cornell index in per cent of 1913–1914[3]
	Actual	Deflated	Actual, per cent of 1913–1914	
	cents per lb.	*cents per lb.*		
1913	6.8	6.67	116	99
1914	4.9	4.90	84	101
1915	5.3	5.15	91	99
1916	5.4	4.19	92	96
1917	5.8	3.22	99	96
1918	6.3	3.18	108	127
1919	6.3	2.95	108	152
1920	6.1	2.65	104	190
1921	7.2	4.80	123	169
1922	6.6	4.34	113	151
1923	7.7	4.94	132	165
1924	7.3	4.80	125	172
1925	8.0	4.94	137	168
1926	7.1	4.61	104	168
1927	7.7	5.17	132	154
1928	7.0	4.58	144	—

[1] As reported by the United States Department of Agriculture. Simple averages of monthly prices
[2] As reported in United States Bureau of Labor Statistics retail price bulletins.
[3] See Table 9 for original data.

a prewar level in terms of 1910 to 1914 dollars. The margins between farm prices of butter in Wisconsin and retail prices of butter in Chicago, however, have been somewhat lower since 1920 in terms of 1910 to 1914 dollars, than in 1913 and 1914 as shown in Table 7. The index computed at Cornell, using Minnesota farm prices as a base, averaged 163 per cent above that in 1913 and 1914, from 1921 to 1928, compared with an increase of only 126 per cent for the same period for the margin between farm prices of butter in Wisconsin as given by the United States Department of Agriculture, and retail prices in Chicago as given by the United States Bureau of Labor Statistics. Charges for the same services in distributing butter seem to have been lower since 1920 than before the war.

For milk, the Cornell study used the margin between prices paid for 3.7 per cent milk at Utica, New York and the retail price of milk in New York City as a measure of margin. The index constructed on this basis, as shown in Table 9 indicates that changes for the same distributive sources have been slightly larger in terms of 1910 to 1914 dollars than before the war. However, the margin between wholesale and retail prices of milk in New York City in 1922 as reported by the United States Bureau of Labor Statistics

TABLE 8.—MARGINS BETWEEN FARM AND RETAIL PRICES OF CHICKENS, 1913-1928

Year	Margin between farm prices in Iowa[1] and retail prices[2] of hens in Chicago			Cornell Index in per cent of 1913–1914
	Actual	Deflated	Actual per cent of 1913–1914	
	cents per lb.	*cents per lb.*		
1913	10.7	10.5	100	100
1914	10.7	10.7	100	100
1915	10.9	10.6	102	93
1916	11.8	9.1	110	107
1917	13.5	7.5	126	124
1918	—	—	—	177
1919	19.4	9.2	181	180
1920	21.5	9.3	201	200
1921	23.3	15.5	218	196
1922	20.4	13.4	191	177
1923	19.6	12.6	183	168
1924	20.4	13.4	191	168
1925	18.3	11.3	171	170
1926	18.9	12.3	177	177
1927	19.2	12.9	179	173
1928	19.4	12.7	181	—

[1] As reported by the United States Department of Agriculture. Simple average of monthly prices.
[2] As reported in United States Bureau of Labor Statistics retail price bulletins.

was only 2 per cent above the margin in 1913 in terms of 1910 to 1914 dollars.

Similar difficulties were encountered in the measurement of margins between farm and retail prices of poultry and eggs as for milk and butter. For poultry Dr. Warren and Dr. Pearson used the margin between farm prices of chickens and retail prices of live hens in the United States as a measure of distributive charges. For eggs they used the margin between farm prices in New York state and retail prices of strictly fresh eggs in New York City. Index numbers constructed on this basis are shown in Table 9. They indicate that charges for distributing these products are considerably higher than before the war in terms of a constant value of money. The above index of distributive margins for eggs tends to represent changes in cost of

the same distributive services. It is very likely, however, that some of the increase in margins since 1910 shown by this index is due to improvement in the quality of "strictly fresh nearby eggs" on which prices were reported. It should be noted that most of the increase in this index above the general price level has come since 1921.

The margin between farm prices of chickens in Iowa (United States Department of Agriculture series) and the

TABLE 9.—INDEX NUMBERS OF THE COST OF DISTRIBUTION OF FARM PRODUCTS[1] (1910–14 =100)

Year	Beef	Pork	Milk	Butter	Hens	Eggs	Wheat flour[2]	Wheat bread[3]	Corn-meal	Pota-toes	Weighted average
1910	84	86	96	98	91	103	97	—	97	104	92
1911	93	99	98	103	97	93	97	—	97	121	98
1912	103	100	100	111	100	86	104	—	101	113	102
1913	109	107	102	94	106	113	106	97	103	91	104
1914	111	110	100	95	107	107	101	109	103	77	105
1915	110	112	98	94	99	97	112	114	109	82	105
1916	114	115	96	91	114	99	117	119	111	123	110
1917	127	136	111	91	132	112	169	134	178	169	129
1918	178	181	134	120	188	126	150	145	223	140	159
1919	186	214	152	144	192	149	170	148	196	175	174
1920	200	237	163	180	213	170	210	177	214	294	202
1921	212	223	175	160	209	157	195	175	189	152	190
1922	194	201	179	143	188	149	175	155	155	160	175
1923	200	205	171	156	179	160	165	158	145	164	177
1924	205	203	168	163	179	167	158	155	167	173	180
1925	202	213	170	159	181	172	174	153	197	206	185
1926	208	222	171	159	188	175	185	158	209	248	192
1927	206	226	171	146	184	183	184	164	206	221	191

* Data are from Table 121, page 99 of "Interrelationships of Supply and Price."

[1] Weighted as follows: beef, 21; pork, 18; milk, 10; butter, 11; hens, 4; eggs, 9; wheat flour, 5; wheat bread, 13; cornmeal, 5; potatoes, 4.

[2] Wheat is assumed to produce 70 pounds of flour and 30 pounds of by-products per 100 pounds. United States retail price of flour and New York price of standard middlings were used. (Farm Economics, No. 49, page 805, December, 1927.)

[3] It is assumed that 100 pounds of wheat produces 30 pounds of by-products and 70 pounds of flour which will make 94 pounds of bread.

retail prices of hens in Chicago (United States Bureau of Labor Statistics) shown in Table 8 indicates about the same changes in margin from 1913 to 1927 as the Cornell index.

The above index numbers of the cost of distributing individual farm commodities are finally combined by Dr. Warren and Dr. Pearson into a single measure of changes in cost of distributing food products in the United States, as shown in Table 9. This composite index indicates that the cost of distributing farm products since 1920 has been relatively higher than in 1910 to 1914 in relation to the wholesale prices of all commodities. Furthermore, the low point in this index since the war was in 1922. Since then it has risen more than 20 points, reaching a peak of 199

in 1929. If the prosperity of farmers is dependent upon low margins as indicated by this index, they are evidently in a worse position now than in 1921 and 1922.

We may, however, conclude from the above analysis of margins that a very large part of the higher cost of distributing farm products since 1920, compared with pre-war years in terms of 1910 to 1914 dollars, indicated by the Cornell index has resulted from an increase in the quantity of distributive services. The margins between farm prices in one producing area and retail or wholesale prices in one consuming area have been about the same since 1920 as before the war in terms of 1910 to 1914 dollars, for most farm products. These latter margins, however, include charges for retail credit, deliveries, small purchases, and processing of food products. And since the quantity of such services demanded by consumers is probably greater now than before the war, the level of charges for the same distributive services is probably lower than indicated by the margins between farm prices in one producing area and retail prices in one consuming area. It seems apparent, therefore, that most of the increase in quantity of distributive service indicated above has resulted from producing and consuming areas moving farther and farther apart as agriculture becomes more specialized and industry becomes more centralized. Such changes need not, however, be a cause of low farm incomes, although they may result in a lower level of farm prices and at the same time a higher level of retail food prices.

Cotton has not been included in the Cornell index of the cost of distributing farm products. While it would be difficult to obtain a representative retail price of cotton goods for the United States during the past twenty years, some idea of the change in distributing charges for cotton since 1909 may be gained by a comparison of farm and wholesale prices such as shown in Table 10. The trends in margins shown by these prices are somewhat conflicting. In terms of 1910-14 dollars the difference between wholesale prices in New Orleans and Liverpool appears to be somewhat less since 1920 than in 1912 and 1913. The difference between wholesale prices in New Orleans and farm prices in Texas

TABLE 10.—MARGINS BETWEEN GEORGIA AND TEXAS FARM AND NEW ORLEANS AND LIVERPOOL WHOLESALE PRICES OF COTTON

Cents per Pound

Year	Price of cotton middlings New Orleans*	Price of Am. middlings Liverpool	Margin between Liverpool and New Orleans prices		Georgia farm[1] price	Margin between New Orleans wholesale and Georgia farm price		Texas farm[1] price	Margin between New Orleans wholesale and Texas farm price	
			actual	deflated		actual	deflated		actual	deflated
1909	14.33				14.00	.33	.32	13.40	.93	.90
1910	14.65				14.29	.36	.38	13.96	.69	.72
1911	10.85				10.28	.57	.58	10.19	.66	.67
1912	12.20	13.75	2.55	2.50	11.76	.44	.43	11.44	.76	.75
1913	13.12	14.75	1.63	1.62	12.77	.35	.36	11.69	1.43	1.42
1914	—	10.50	—	—	7.98	—	—	7.85	—	—
1915	11.68	14.79	3.11	2.72	11.32	.36	.31	11.21	.47	.41
1916	18.84	24.39	5.55	3.47	18.76	.08	.05	17.88	.96	.60
1917	28.96	42.64	13.68	7.17	28.82	.12	.06	27.34	1.62	.85
1918	29.87	39.54	9.67	4.72	28.86	1.01	.49	28.52	1.35	.66
1919	38.21	40.88	2.67	1.14	36.98	1.23	.53	34.37	3.84	1.64
1920	16.55	18.00	1.45	.81	16.48	.07	.04	14.90	1.65	.92
1921	17.92	19.67	1.75	1.20	17.18	.74	.51	16.71	1.21	.83
1922	25.94	28.51	2.57	1.63	25.13	.81	.51	24.38	1.56	.99
1923	30.33	31.90	1.57	1.03	29.53	.80	.52	28.05	2.28	1.49
1924	24.21	26.12	1.91	1.20	23.48	.73	.46	23.57	.64	.40
1925	19.71	21.82	2.11	1.34	18.91	.80	.51	18.44	1.27	.80
1926	14.74	16.57	1.83	1.23	13.22	1.52	1.02	13.05	1.69	1.13
1927	19.98	22.66	2.68	1.76	19.39	.59	.39	19.27	.71	.47
1928	18.98				18.44	.54	.35	17.72	1.26	.83

* U.S.D.A. Yearbook, 1926, Tables 251 and 252, pp. 974 and 975 and monthly crop reports for later years. Simple averages of monthly prices.

[1] U.S.D.A. Statistical Bulletin No. 16. Simple averages of monthly prices.

from 1924 to 1928 has also been lower; but the margin between farm prices in Georgia and wholesale prices in New Orleans has been somewhat higher in terms of 1910-14 dollars since 1920 than for 1909 to 1913, largely because of an extremely high margin in 1926.

Causes of Increasing Fluctuations in Farm Prices

One of the evils of larger margins between prices received by producers and paid by consumers is said to be greater fluctuations in farm prices and farm incomes, even though farm incomes are not reduced over a series of years. With higher margins, and distributing charges tending to remain fairly constant from year to year, farm prices must fluctuate more in terms of percentages of themselves for the same fluctuations in retail prices. The effect of an increase in such a margin upon farm price fluctuations, however, depends to a large extent upon the relation of yearly changes in margin to changes in the prices of farm products. Thus Warren and Pearson maintain in their bulletin that the margin taken by distributors tends to be the same or slightly

larger for most farm products in years of large production and relatively low prices than in years of small production and high prices. They base this conclusion upon an analysis of the margins between farm and wholesale or retail prices in years of large and small production in the United States for a large number of farm products.

Unfortunately this evidence cannot be taken as conclusive proof of the actual relationship between margins taken by distributors and volume of production. In the first place, practically all of the comparisons are between production in the United States as a whole and margins between farm prices in one producing area and wholesale or retail prices in one market or consuming area. The relationships as determined therefore assume that volume of production in the producing area for which farm prices are used does not effect the margins obtained. In the second place, many and perhaps all of the margins used in working out average margins for years of large and small production have not been deflated. Then, too, there may be some question as to the method of separating years of large and small production.

The influence of some of these factors on the relationship of margins taken to volume of production may be illustrated for patatoes. The relation of margins between Batavia farm and New York wholesale prices, in terms of 1910 to 1914 dollars, shown in Table 2, to percentage of a normal trend in size of United States potato crop is shown in Figure 1. With the exception of 1926, there appears to be a slight upward trend in these margins as the size of crop increases. Even with 1926 included the average margin was slightly lower for crops below 100 per cent of normal than for those above. Apparently distributors of potatoes for Batavia farmers take a smaller margin on a smaller volume of business in small crop years than in large crop years. Dr. Warren and Dr. Pearson write as follows:

> Probably the explanation of the problem is in the difference between a "buyer's" market and a "seller's" market. When there is a large supply it is more difficult for the retailer to sell. He knows that all wholesalers are anxious for his business and thus in no hurry to buy. He will not buy except at a low price. The country buyer has difficulty in selling. He knows that

the farmers have a large supply and is reluctant to buy except at a very low price. The farmer finds difficulty in selling because wherever he turns he is met by the same indifference. Sometimes no one will buy at any price.

If there is a short supply, the country buyer is eager to get the farmer's crop, but the farmer does not need to take the first offer. Plenty of other buyers want the crop. (Page 23. "Interrelationships of Supply and Price.")

This explanation, however, does not take account of possible relationships between size of crop and seasonal trends

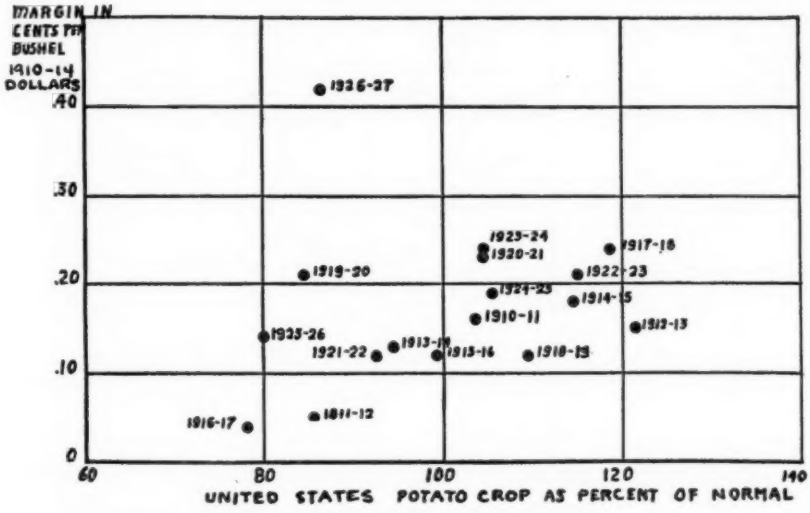

FIG. 1.—RELATION OF MARGIN BETWEEN NEW YORK CITY WHOLESALE PRICES AND FARM PRICES AT BATAVIA, NEW YORK TO SIZE OF UNITED STATES POTATO CROP.

of prices. Preliminary analysis of such relationships for potatoes, apples, and corn made by various investigators indicate that the upward seasonal trend of prices is greater on the average in years of small crops than in years of large crops. Under such conditions distributors might buy on a small margin for any one day and yet have a large margin between purchases and sales. In 1911 and 1916, the years of small crops and very low margins, there was a very marked upward trend in potato prices from October to May. Distributors probably made a large profit in these years in spite of the low margins shown in Table 1 and Figure 1. The possibility of such speculative profit may in fact be

the cause of low margins between farm and wholesale prices for any one day or month. In order to obtain a very good indication of the margins actually taken by distributors in years of large and small crops, it would be necessary to weight farm prices by sales of farmers and wholesale prices by sales of wholesalers or possibly by rates of consumption.

A somewhat different picture of these relationships is

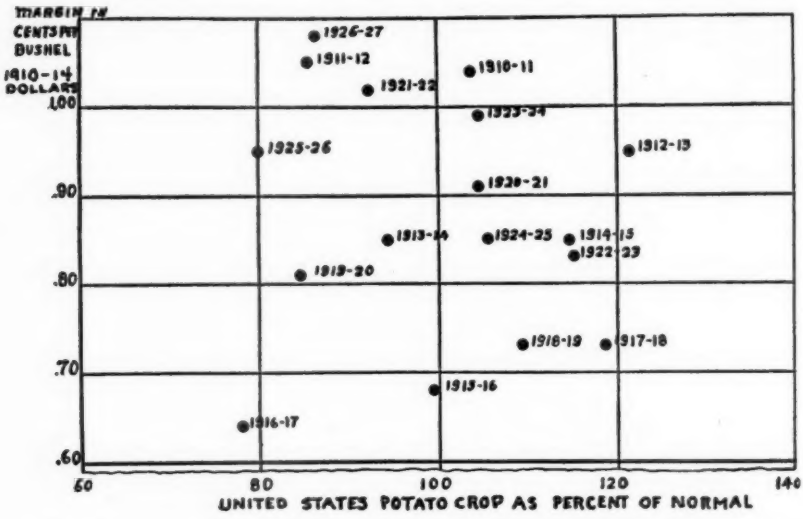

FIG. 2.—RELATION OF MARGIN BETWEEN NEW YORK CITY RETAIL PRICES AND FARM PRICES AT BATAVIA, NEW YORK TO SIZE OF UNITED STATES POTATO CROP.

also obtained by comparing the margins between farm and retail prices in terms of 1910 to 1914 dollars, shown in Table 2, with size of crop as shown in Figure 2. This margin tends to decline slightly as production increases, although the tendency is not very strong. The average margin for crops above normal is 87.5 cents per bushel compared with 88.5 for those below normal. If the margin in 1915, for which production is 99.1 per cent of normal, is included with the large crops the difference in average margins becomes much larger,—85.6 for those years with production above 99 per cent of normal and 91.4 for those below.

It is also interesting to note in this connection that Dr.

Working in the above mentioned review pointed out that "When the data (from Table 8 for potatoes and Table 30 for cabbage) are studied in chart form, they lead the present reviewer to the conclusion that the spread tends to narrow rather than to widen in years of large crops and low prices".[6]

Again it is necessary to emphasize the fact that such results merely indicate possible relationships. Nothing has

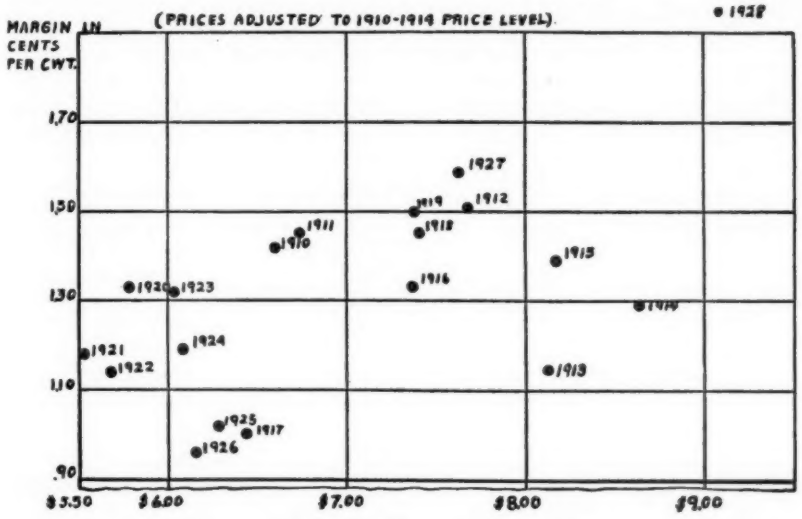

FIG. 3.—RELATION OF MARGIN BETWEEN WHOLESALE PRICES OF HOGS AT CHICAGO AND FARM PRICES IN IOWA TO HOG PRICES AT CHICAGO.

been said of the relation of size of crop around Batavia, New York to the size of United States crop or of the influence of the size of crop around Batavia on the above margins. Since the Batavia producing area is near large cities, in years of small crops a larger percentage of the potatoes grown in this area may be sold at retail or to nearby retail stores or wholesalers than in years of large crops. All of these circumstances make the accurate analysis of such a problem extremely difficult.

Some indication of the relation between size of margins taken by middlemen and volume of production for beef cattle and hogs may be gained from Figures 3 and 4. If

[6] Journal of the American Statistical Association, December, 1929, page 440.

prices in terms of 1910-14 dollars may be taken as a good measure of supply, then the margin between Iowa farm and Chicago wholesale prices of beef cattle and hogs tends to increase rather sharply as volume of production decreases. Since the opportunity of holding hogs and cattle for speculative gain by local buyers is very small compared with most crops, these results tend to substantiate the above theory that the possibility of gains may be a major cause of low margins in years of high prices for potatoes.

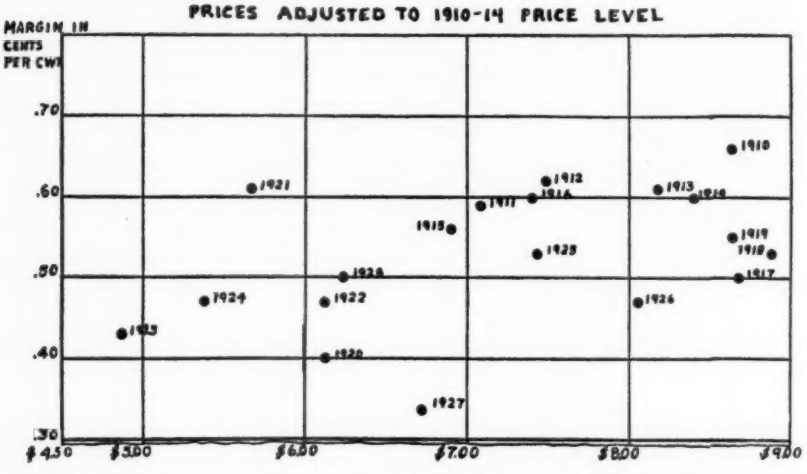

FIG. 4.—RELATION OF MARGIN BETWEEN WHOLESALE PRICES OF BEEF STEERS AT CHICAGO AND FARM PRICES OF BEEF CATTLE IN IOWA TO PRICES AT CHICAGO.

These results, however, are far from proving such a theory. They merely indicate that margins actually taken by middlemen may be smaller in years of large production and low prices than in years of small production and high prices. Even though this statement should prove to be correct, the fact would still remain that margins remain fairly constant from year to year compared with fluctuations in farm prices; and an increase in this margin would cause farm prices to fluctuate more for the same fluctuations in retail prices if other things remained the same.

The test of this would be historical changes in the fluctuations of farm and retail or wholesale prices. These may be taken as evidence of changes in size of margin between

these two price series and of the relative stability of this margin from year to year. Measures of these historical price changes have been worked out for potatoes by Dr. Warren and Dr. Pearson. They found the relationships between the United States supply and December 1 farm price of potatoes during four periods in the past as shown in Table 11.

Thus when the United States potato crop was 20 per cent below normal, farm prices of potatoes were on the average 24 per cent above normal during the period of inflation from 1915 to 1920, compared with 116 per cent during the period of deflation from 1921 to 1925, and 35 per cent before the War. Apparently "financial deflation increases the vio-

TABLE 11.—RELATION OF UNITED STATES PRICES OF POTATOES TO SIZE OF CROP*

Period	United States Potato Crop 20 per cent below normal	United States Potato Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
1871–1894	29	19
1895–1915	35	22
1915–1920	24	16
1921–1925	116	47

* "Interrelationships of Supply and Price." Tables 4 and 5.

lence of farm price fluctuations,"[7] and inflation decreases them. During a period of deflation "freight rates and handling charges remain high and represent such a large part of the retail price that any given change in retail prices that is necessary to dispose of a large supply represents a very high percentage of the farm price."[7] The commercialization of agriculture, decrease in the flexibility of demand and other factors are also included as having some influence. But the major cause, in the opinion of the two authors is high handling charges for they state that "changes in demand have some effect, but the result at the present time is due primarily to high handling charges."[7]

Some indication of the probable effect of increased handling charges on the fluctuations of farm prices is shown by the difference in supply price relationships for potatoes in surplus potato producing areas, such as Batavia, New York, and deficit producing areas, such as Rhode Island, or com-

[7] "Interrelationships of Supply and Price," pages 17 and 18.

bination of surplus and deficit producing areas, such as the United States worked out by Dr. Warren and Dr. Pearson. They show in Tables 1, 2 and a note at the bottom of Figure 11 of "Interrelationships of Supply and Price", that farm prices in each area were above normal on the average by the percentages shown in table 12 from 1895 to 1915 and from 1921 to 1925 when the United States potato crop was 20 per cent below normal.

Apparently concentration of potato production in particular localities would result in increased fluctuations of farm prices. Offsetting these tendencies, however, would be a greater stability of farm prices in the larger deficit producing areas and probably greater stability in production from year to year. Besides, a definite shift of large areas having

TABLE 12.—PER CENT THAT POTATO PRICES WERE ABOVE NORMAL IN STATED AREAS WHEN UNITED STATES PRODUCTION WAS 20 PER CENT BELOW NORMAL

Period	Rhode Island[1]	United States[1]	Batavia, New York
1895–1915	22	35	54
1921–1925	105[2]	116	177

[1] December 1 farm prices, except for Rhode Island from 1921-1925 where average prices from October to June were used.
[2] Formula, Log (y–c)=Log b–a Log x, used in determining this percentage. See comment on page 549.

a deficit of potatoes some years and a surplus in others to either continuously deficit or continuously surplus producing areas might reduce fluctuations of farm prices for the United States as a whole.

A much more important cause of increased fluctuations in farm prices, of potatoes at least, is the decrease in elasticity of demand. The importance of this change is minimized by Dr. Warren and Dr. Pearson in their statement that "some persons have studied the increasing flexibility of wholesale and farm prices and have attributed it to changes in consumers' demand. Retail prices do not substantiate this view. Changes in demand have some effect, but the result at the present time is due primarily to high handling charges. The long-time tendency is due in part to increased inflexibility in demand, but other factors are more important." (Page 17.) However, the supply-price relationships which they have worked out indicate that all of the increase in farm price fluctuations of potatoes and

corn since 1920 compared with pre-war years can be accounted for by changes in the fluctuations of retail prices. These relationships are shown by the following percentages of normal farm, wholesale and retail prices for United States potato crops 20 per cent below normal during the two periods 1895 to 1915 and 1921 to 1925, taken from Tables 1 and 2 of "Interrelationships of Supply and Price." (Table 13.)

When the United States potato crop was 20 per cent below normal, farm prices at Batavia, New York, were 177 per cent above normal from 1921 to 1925 compared with 54 per cent from 1895 to 1915, or an increase of 123 points. The percentage for retail prices advanced only from 6 to 68 or an increase of 62 points while the increase for wholesale prices

TABLE 13.—PER CENT THAT POTATO PRICES WERE ABOVE NORMAL WHEN THE UNITED STATES POTATO CROP WAS 20 PER CENT BELOW NORMAL

Locality	1895–1915	1921–1925	Differences in percentage	Percentage increase
Farm Prices, Batavia, N. Y.	54*	177	123	328
Wholesale Prices, New York City	38	106	68	180
Retail prices, New York City	6	68	62	1033

* 1897-1915.

was 68. Percentage changes in prices when the United States potato crop was above normal tell much the same story. It would seem from this that retail prices were not the cause of increasing farm price fluctuations; hence it may be the margin taken by the in-between fellow.

But the difference in price level has been overlooked. The percentage of increase from 1895-1915 to 1921-25 in per cent of normal prices when production is 20 per cent below normal is 328 for farm prices and 1033 per cent for retail prices. (Table 13 above.) If these figures do not sound reasonable, suppose we calculate the effect of the above change in retail price fluctuations on farm prices. According to the data presented by Dr. Warren and Dr. Pearson, farm prices at Batavia, New York, averaged 56 cents per bushel from 1910 to 1914 and retail prices in New York City averaged $1.50. The spread between these two is 94 cents.

If this average retail price in New York City of $1.50 per bushel from 1910 to 1914 is multiplied by the percentage that New York City retail prices were of normal, when the

United States potato crop was 20 per cent below normal, of 106 per cent for the period 1895 to 1915 and 168 per cent for the period 1921 to 1925, the resulting estimate of retail prices would be $1.59 and $2.52 respectively. Deducting the average spread of 94 cents from both estimates, since Dr. Warren and Dr. Pearson maintain that this margin remains constant or increases slightly in small crop years, would leave 65 cents per bushel as the resulting estimate of farm prices for the pre-war period and $1.58 for the post-war period. These farm prices are 16 and 182 per cent respectively of the assumed "normal" or average price from 1910 to 1914. In tabular form these calculations would appear as follows:

TABLE 14.—PRICE-MARGIN RELATIONSHIPS WHEN THE UNITED STATES POTATO CROP WAS 20 PER CENT BELOW NORMAL

Period	Per cent of normal retail price worked out by Drs. Warren and Pearson	Estimated retail price in New York City	Margin	Resulting estimate of farm prices at Batavia, New York	Per cent that farm prices would be above the normal of 56 cents
1895–1915	106	$1.59	94	$0.65	16
Assumed "Normal" Average Price 1910–1914	100	1.50	94	0.56	
1921–1925	168	2.52	94	1.58	182

Thus an increase from 16 to 182 per cent of normal, or 166 per cent, is to be accounted for by changes in retail prices alone. This is to be compared with an estimated increase for Batavia, New York, of only 123 per cent, or from 54 to 177, and for the United States of only 81 per cent, or from 35 to 116. Here, then, is an explanation of the increase in violence of farm price fluctuations to the effect that the increase in fluctuation of retail prices as worked out by Dr. Warren and Dr. Pearson with a constant pre-war margin would account for more than the indicated increase in fluctuations of farm prices.

There is, of course, a large possibility of error in the supply price relationships shown here. The supply and Batavia farm price and New York City wholesale price relationships were worked out from the formula $\text{Log } y = \text{Log } b - a \text{ Log } x$, where y equals the per cent that price is

above the preceding five-year average in terms of purchasing power and x equals the per cent that supply is above the preceding five-year average as normal. The same formula was also used for working out the relation of United States supply to retail prices in New York City from 1897 to 1915. But the following formula was used for the period 1921 to 1925: Log (y – c) = Log b – a Log x, in which c is a constant representing the average per cent that retail prices in New York City were above farm prices in some base period not stated, but probably from 1910 to 1914. The use of (c) in this equation tends to reduce the percentage fluctuations in prices.[8] Consequently, if the formula used to determine the United States supply and New York City retail price relationships from 1897 to 1915, had been used for the period 1921 to 1925, the per cent that retail prices were above normal in the latter period when supply was 20 per cent below normal would have been somewhat higher than the 68 per cent shown above. The reason for including such a constant as (c) in one period and omitting it in the later periods needs to be explained. Besides, some of the supply-price relationships shown here are based upon a very small number of years, and the coefficients of correlation and probable error of estimates are not given.

No reliable conclusions can therefore be drawn as to the increase in farm, wholesale or retail price fluctuations of potatoes. All of the evidence presented, however, tends to indicate that changes in retail price fluctuations since pre-war years would account for more than the actual increase in farm price fluctuations of potatoes.

Similar conclusions might be drawn from the following supply-price relationships between the United States corn crop and December 1 farm prices of corn and retail prices of cornmeal for calendar years in the United States taken from Table 129 of "Interrelationships of Supply and Price."

These supply-price relationships indicate that the increase in retail price fluctuations from 1921 to 1925 above those

[8] On page 117 of "Interrelationships of Supply and Price" the statement is made with respect to the United States supply and retail price of potatoes, October to June, 1917-18 to 1925-26 that "with a crop 20 per cent below normal, the price would be expected to be 63 per cent above normal; but if the constant had been omitted, the answer would have been 71 per cent above normal. The error increases with larger crops."

from 1910 to 1914 and retail prices in New York City averaged corn. The supply-price relationships shown here for 1915 to 1920 and 1921 to 1925, however, are based upon a very small number of years and are consequently subject to a high degree of probable error. It should also be noted that the retail prices used are for calendar years, and that the demand for cornmeal for home consumption represents an insignificant market for corn. Still these results indicate that changes in retail price fluctuations since prewar years would account for more than the actual increase in farm price fluctuations of corn. Consequently it might be reasoned that specialization in the production of potatoes and corn is tending to reduce rather than increase farm

TABLE 15.—SUPPLY-PRICE RELATIONSHIPS IN THE UNITED STATES FOR CORN AND CORNMEAL

Period	Crop 20 per cent below normal		Crop 20 per cent above normal	
	Per cent that prices were above normal		Per cent that prices were below normal	
	United States farm price, December 1	United States retail price calendar year*	United States farm price, December 1	United States retail price calendar year *
1877–1894	21		14	
1895–1913	41	4	24	3
1915–1920	30		19	
1921–1925	63	70	33	35

* Retail prices are for the calendar years 1896-1914 and 1922-1926.

price fluctuations or that margins fluctuated more closely with farm prices from 1921 to 1925 than from 1895 to 1913.

There is a lack of similar analyses for such important cash crops as wheat and cotton, and for cattle, hogs and sheep. For meat animals, farm price data previous to 1909 are not available, but for wheat and cotton, December 1 prices are available for as long a period as for corn.

We must conclude therefore that aside from potatoes and possibly corn where changes in the flexibility of demand may have been a major factor, very little evidence has been presented by Dr. Warren and Dr. Pearson in their bulletin "Interrelationships of Supply and Price" to show that farm prices as a whole now fluctuate more than before the war or that an increase in margin between farm and retail prices has been the primary cause of any such increase in farm price fluctuations. A much more thorough analysis is necessary to prove these contentions.

Summary

All of the analysis presented in this article suggests, first, that charges made for the same distributive services in handling farm products have been about the same since 1920 as before the War, that margins between farm and wholesale or retail prices of farm products have been higher since 1920 than before the War largely as a result of the concentration of population in particular localities, the specialization of agriculture and other factors tending to increase the quantity of services required in distributing farm products, which should not be a cause of low farm incomes; second, that the margin between farm and wholesale prices of hogs, and beef cattle, tend to increase as these prices, in terms of 1910 to 1914 dollars, increase or as production decreases, while for potatoes the margin between and retail or wholesale price quotations tends to remain constant in large and small crop years, but that actual margins between what producers receive and consumers pay may still be larger in years of high prices than in years of low prices; third, that changes in retail price fluctuations of potatoes and corn since 1920 compared with pre-war years account for more than the changes in farm price fluctuations, assuming a constant pre-war margin between farm and retail prices, as worked out by Dr. Warren and Dr. Pearson, and that very little evidence has been presented to show that farm prices now fluctuate more violently than before the War. We must therefore conclude that the evidence presented does not warrant the conclusion that relatively high costs of distribution have been the "most serious single factor in causing the agricultural depression" or even that they have been a very important factor.

THE AGRICULTURAL DEPRESSION AND THE TECHNICAL REVOLUTION IN FARMING[1]

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The agricultural depression continues to hold the center of general attention. However, notwithstanding the abundant literature devoted to the subject, the general accepted explanations of the present depression are, it seems to me, of doubtful validity. The cause of the depression is sought primarily in the changing conditions of the demand for agricultural products, due to the decreased purchasing power of Europe, especially of Germany. An eminent German economist, Professor M. Sering, attributes the depression entirely to this factor. Such an explanation, however, is obviously inadequate. For, if it is true that post-war Europe is unable to pay a full price for agricultural products, then what compels the American farmers to sell their produce at the low price? After all, the agricultural production of the United States could have been curtailed, which would have been a natural consequence of the depression.

Most American economists, although they consider the changing conditions of the European demand as the primary cause of the depression, nevertheless usually go further and try to explain why the farmers cannot rapidly reduce their output and adjust themselves to the changing market conditions. Here a number of reasons are usually given and some of them have a certain significance. In the final analysis, however, all these explanations of the depression will seem inadequate if we recall only this fact—that the volume of agricultural production instead of remaining stationary, is actually rapidly increasing.

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[1] Professor Studensky visited the United States in 1929, spending some months in travel and some time in Washington, D.C. In order to express his ideas more clearly, he wrote the following article in his native language. This translation was made by Mr. L. Volin of the Division of Statistical and Historical Research, U. S. Department of Agriculture, Washington, D.C. Dr. O. E. Baker read the translation at Professor Studensky's request and made a few changes. Mr. D. Curtis Mumford verified some of the figures as to sources and indicated the references. This translation, therefore, includes a few changes insofar as they apply to ascertainable facts. The editors of the *Journal* assume no responsibility for the subject matter contained in this article but are presenting it as an interesting viewpoint of American agriculture as seen by a foreigner. THE EDITOR.

From 1917-1921 to 1922-1926 the average total acreage under crops in the United States decreased [from 1919 to 1924 by 13,000,000 acres], and the number of livestock also decreased, with the exception of dairy cows, sheep, and chickens. Comparing the two 5-year periods, the total agricultural production increased by 13.5 per cent.[2] As pasture land remained practically stationary, it is evident that the productivity per acre of the cultivated area increased by fully 13.5 per cent. Since 1925 the acreage of crop land in the United States has been on the increase, but production has increased even more rapidly. Proof that this phenomenon of increasing agricultural production is not confined to the United States is indicated by the following figures of wheat production in the principal countries supplying the world market.

Year	United States Million bushels	Canada Million bushels	Argentina Million bushels	Australia Million bushels
1925	676	395	191	115
1926	831	407	221	161
1927	878	480	239	117
1928	903	534	—	154

Not only the total production but also the production per acre has increased, as was noted above in the case of the United States. It is the task of theory to explain in the first place this remarkable fact of the increase in agricultural production during a period of an acute farm depression.

Side by side with the growing volume of production, we also observe indisputable symptoms of a decline in the agricultural industry. Thus the percentage of bankruptcies in the United States is six times higher than before the war, and about half a million people have been annually leaving the farms for the cities. This strange paradox can be explained only by an analysis of the modern conditions of agricultural production, and it is really remarkable that very seldom have economists sought the cause of modern depression where it actually can be found—in the changing conditions of agricultural production.

Among the rare exceptions must be noted W. I. King's

[2] Estimate of O. E. Baker in "Do We Need More Farm Land?" a mimeographed address issued by the Bureau of Agricultural Economics, Washington, D.C., 1929.

careful analysis, which led him to the conclusion that the internal combustion engine is the main cause of the present depression.[3] King pointed out that the tractor has displaced a large number of horses on the farm, with the resulting decreased consumption of grain, and liberation of 15,000,000 to 20,000,000 acres for the production of commercial crops. In this fact he sees the main cause of the depression. Now, it is impossible to deny the great importance of the release of acreage which the substitution of mechanical for animal power in agriculture made possible. We cannot agree, however, with those who see in it alone the cause of the present depression, even if, as is probable, the acreage released as a result of the discarding of horses on the farm will increase in the future. It is impossible to explain the depression solely by this theory because, after all, no one compels the farmer to plant the area formerly used for feed grains to other crops; it could have remained idle which, as was pointed out above, would have been a natural consequence of the depression.

My hypothesis concerning the nature of the present agricultural depression can be briefly formulated, as follows: (1) The present agricultural depression is not a mere continuation of the crisis of 1920. Strictly speaking, it is not a "depression," although I use this term in accordance with the generally accepted terminology. (2) Although it takes the form of a depression, it is actually the beginning of *profound agricultural crisis,* which will cause considerable shifts and changes in world agriculture, particularly in grain farming. (3) This crisis was inevitable and unavoidable, and would have taken place anyway, even if there had been no deflation or crisis in 1920, although it is probably true that the latter accelerated and therefore accentuated the developing agricultural crisis. (4) At the bottom of the approaching agricultural crisis is an immense technical revolution wrought by the internal combustion engine. The importance of this revolution for the future of agriculture defies imagination.

It may as well be admitted that such a hypothesis is

[3] "The Gasoline Engine and the Farmer's Income," Journal of Farm Economics, Vol. XI, No. 1, January, 1929.

sharply at variance with the prevailing opinion. Eminent authorities on agricultural economics maintain that the mechanization of agriculture can not substantially lower the cost of production and exert an influence on prices of farm products. (For example: G. F. Warren and H. C. Taylor in the United States and T. H. Brinkmann, M. Sering, and T. H. Roemer in Germany.) It is true that some writers devote considerable attention to the successful mechanization of agriculture (for instance, E. G. Nourse) and on occasion speak about the technical revolution in modern agriculture. As a rule they stop, however, short of the conclusions which, it seems to me, must follow from such a view. It behooves us, therefore, first of all to prove that the technical revolution is not a figment of imagination but an actual fact and then to examine its effects on the agricultural situation.

Since the tractor is one of the most potent instruments of the new agricultural revolution, we may make it a starting point in our analysis. The question to which we must address ourselves first of all is why, for a long time, the tractor did not materially reduce the horse population on the farms and produce a revolution in agriculture. Here the following points should be noted. (1) A tractor, like every other new machine, requires a period of experimentation and improvement before it is perfected, and the operating cost is sufficiently reduced to make its use profitable. Until it passed through such a period the tractor could not become adopted on a large scale in farming. The tractor was born in a world of horse agriculture and it was therefore compelled in the beginning to adapt itself to this rather foreign environment, which was obviously a handicap to the rapid development of its potentialities. (2) The various farm implements, while very well adapted to the animal power, were either little or entirely unadapted to the tractor. Therefore, the tractor during the first period of its existence could not be fully utilized and could not rapidly displace horses, as the absence of special implements made the use of the tractor uneconomical in certain operations. (3)The ordinary tractor is not adapted to the cultivation of row crops, and this is another reason why horses are

being retained side by side with the tractor. (4) In those cases where the introduction of the tractor was not accompanied by the purchase of a truck, horses were still needed for hauling purposes. (5) The tractor, before it really could produce a revolution in farming, had to overcome the strong inertia prevailing in modern agriculture, the organization of which was adjusted to the old technique. This inertia, resisting tractorization, is manifested in the insufficient size of the farms, absence of special equipment and, in fact, in the whole scheme of modern small-scale farming. Before such inertia was overcome, the tractor could not reach its maximum productivity. Particularly, the size of the typical tractor was dictated not by the consideration of its optimum efficiency but by the conditions of modern farming. The first experimental period in the history of the tractor, however, has almost come to an end, although of course considerable changes in models are still possible in the future.[4]

The best answer to those who are skeptical of the technical progress in farming and who are constantly harping on the inexorable biological nature of agriculture, is given by the figures on the production of tractors. In the United States alone the number of tractors produced and exported was as follows:[5]

Year	*Production*	*Exports*
1922	99,692	10,232
1923	134,590	16,643
1924	119,305	25,622
1925	167,640	45,981
1926	181,995	47,726
1927	200,500	58,274

In 1920 there were in the United States 506,748 tractors; in 1928 probably 770,000, and by 1930 their total number may reach 1,000,000. Tractors and trucks on the farm have already displaced about 7,000,000 horses and mules. How can such a growing tractorization of agriculture be explained, if, as some authorities assert, the tractor cannot lower the cost of production and increase the profits of

[4] The first successful internal combustion tractor was made in 1901. In 1916 there were manufactured in the United States almost 200 different models, while in 1928 the number of types was reduced to 88. There is already observed a tendency toward standardization, although there is still plenty of room for improvement in this direction.

[5] Source: "The Tractor Industry and its Part in Power Farming," New York: Harvey Fisk and Son, 1929, p. 35.

farmers? The fact of the matter is that the critical period in the history of the tractor has passed and that the revolution in agriculture as a result of the utilization of the internal combustion engine has already begun.

In the first place, basic improvements were made in the design of the tractor itself, which considerably decreased the cost of its operation. The consumption of fuel per horsepower-hour in the modern tractor is considerably lower than in the old types. How great the potentialities in this respect are is shown by the fact that the Diesel engine which only recently was considered entirely unsuited for the tractor has now been adapted for agricultural tractor use. Field tests have shown that the Diesel tractor develops a double coefficient of utilization of heat in comparison with an ordinary tractor, and uses low-grade cheap fuel. The fuel cost per horsepower-hour has therefore been reduced to 1/3 and even 1/5 of the amount in the case of an ordinary tractor. Still this is only a beginning. The United States Department of Agriculture gives the following estimate of the annual operating cost per horsepower-hour of a tractor and a horse in 1924 with an average load, excluding the cost of labor.[6]

Horse	25c
Tractor, belt work	6c
Tractor, drawbar work	12½c

If labor costs in connection with the operation of the horses and tractors were to be included in the estimate, then the difference in favor of the tractor would be still further increased, since there are several more units of power per laborer in the case of a tractor than in the case of a horse. However, the advantage of the tractor consists not so much in the fact that it supplies cheaper power, but that it permits an entirely different organization of farm work, and that it makes for a complete change in the farm equipment. We may actually observe how all implements which are used on American farms are gradually being transformed, and if previously the tractor was adapting itself to the implements, now the situation is entirely reversed.

[6] Kinsman, C. D., "An Appraisal of Power Used on Farms in the U. S." Department Bulletin 1348, U. S. Department of Agriculture, 1925, p. 8.

The speed of a tractor, as well as of a truck,—the whole tempo of its work—is immensely greater than that of a horse or a mule. This greater speed has, in some instances, made possible a marked change in the agricultural calendar, and has permitted also greater geographical specialization of field crops, with the resulting increase in productivity. The westward shift of wheat production in the United States at the expense of grazing areas and the concentration of corn in the northwestern part of the Corn Belt at the expense of wheat, are largely the result of mechanization. Here is one of the most important reasons why the United States was able recently to increase its agricultural productivity without expanding, and in some cases even while decreasing the crop acreage.

I will now show briefly how the internal combustion engine is transforming the whole complement of American farm equipment. Harvest time was until recently the busiest season in grain farming. The number of draft animals, and of harvesting machines, and to a considerable extent the area which could be sown to grain on a farm of a given size, were determined with reference to harvest time. The spreading use of the combine which harvests and threshes grain in one operation radically changed the situation, and harvest ceased to be the most strenuous season on the farm. The achievements of the combine, however, must be related to the internal combustion engine. The idea of a combined harvester-thresher was born as early as the beginning of the last century, and the first combines were made considerably earlier than binders. It is a good example of an idea which was born before its time. At the beginning of the present century there were already several thousand combines in California and other western states, and also in Australia and Argentina. The machine, however, was not widely used and did not prove entirely successful until very recently. It is the internal combustion engine which, I am convinced, has given an impetus to the development and improvement of the combine. Until the cutting apparatus and the thresher in the combine acquired a separate source of power, entirely independent of traction, the combine could not become the highly perfected and efficient

machine which it is now. At present most of the combines are manufactured with separate engines for cutting and for threshing power. The following figures[7] of the production of combines in the United States will show the rate at which this machine is being introduced into American agriculture:

Year	*Production*	*Export*
1920	3,627	929
1923	4,012	2,986
1926	11,760	4,707
1927	18,307	4,072
1928	27,800	6,800

A tendency which must also be noted is that of the increasing size of the combine. While only 9.4 per cent of all the combines manufactured in 1920 had over 10-foot cut, in 1927 this class accounted for 70.1 per cent of the total production. In the western states of the United States, combines of 20 and 24 feet are widely used, and in some cases one can find even combines of 40 and 48 feet.

The use of a combine instead of a binder and stationary thresher decreases labor requirements per acre approximately to one-fifth and the total harvesting cost is cut at least by half. Such an enormous increase in the productivity of labor, which undoubtedly will be enhanced still further by future improvements of the combine, makes it reasonable to prophesy that it will entirely displace the binder and stationary thresher on the great majority of farms within the next few years. The binder, this wonderful invention of the recent past, with its almost human capacity and its enormous significance in the agricultural revolution of the 19th century, will become at one stroke unnecessary, costly, and obsolete. Such is the rate of modern technical progress. The saving which the combine already gives, as against the old methods of harvesting grain, amounts to 15 or 20 cents per bushel, which constitutes from 15 to 20 per cent of the total cost of production.

The combine is now successfully used in all regions of the United States and Canada, as well as in Australia and Argentina. Tests have also shown that it is well adapted for European conditions. At a very insignificant additional

[7] Source: "Combine Yearbook, U. S. and Canada." 1929. Madison, Wis. Clarke Publishing Co.

expense, straw can be easily gathered when harvesting is done with the combine. The loss of grain when the combine is used is less than under any other method, and the grain obtained is of a good market quality. Where the climate is humid or where there are too many weeds, the grain is cut and left in a windrow and two or three days later the combine is used with a pick-up device replacing the cutting device. This method if harvesting costs 50 cents more per acre, but it makes the use of the combine practicable under almost all conditions where the topography of the land, size of fields, and the number of acres in small grain permit the use of large-scale machinery. Considerable experience with the combine during the last two or three years in all the states of the Corn Belt has shown indisputably their usefulness and efficiency.

The planting season ranks next to the harvest in the amount of strain it involves. Here, also, the tractor produced a radical change. At present, one person with a large tractor-drawn seeder can sow from 70 to 80 acres per day, while using a 50 horsepower tractor a worker can plow up to 18 acres per day. As a result, we have a situation where harvesting and sowing seasons have ceased in the same sense to be critical periods in the agricultural calendar. Tilling, on the contrary, is now considered the most critical farm operation with the result that all the forces of technical invention have been drawn in that direction. The tractor here has also been helpful. It led to the designing and manufacture of new and highly efficient plows and harrows adapted for use with the new traction power. Especially important for the grain regions are the disk plows and harrows. It was estimated that the tilling of an acre with a one-bottom plow drawn by a team of two horses costs, in the United States $3 to $4, while with a tractor-drawn three-bottom plow the per-acre cost is reduced by one half. Very recently, further improvements have taken place in the technique of the preparation of the soil, which considerably increased the efficiency of labor. Thus, the one-way disk plow, having a width of cut of 5 to 10 feet, combines plowing and harrowing in one operation. If one person can plow 14 acres a day with four plow-bottoms,

tractor-drawn, then with a 10-foot, one-way disk plow, he can prepare 25 to 40 acres a day. A 50-horsepower tractor can pull three 10-foot one-way disk plows, thus covering up to 9 acres per hour. As a result, even the present complement of tractor-drawn implements makes it possible to reduce the labor-time per acre to only two or three hours in the case of wheat, instead of 10 to 15 hours required formerly; and 3 to 5 hours in the case of corn instead of 15 to 20 hours required prior to the advent of the tractor.

Can all this be called anything else but a revolution? And we see how in the process of this technical revolution caused by the internal combustion engine the very face of agriculture is being radically altered and becomes unrecognizable.

A few words concerning the farmers' need of a general-purpose tractor. The ideologists of small-scale farming have always insisted that agriculture, as distinguished from the manufacturing industry, requires general-purpose machinery because it is more diversified and because it cannot avail itself of all the advantages of large specialized machines. We saw that during the first period of its development the unsuitability of the tractor for the cultivation of row-crops had actually restricted its usefulness and was responsible for the retention of horses on the farm. A general-purpose tractor, however, was designed and is being manufactured at present on a large scale, and thus makes the introduction of the tractor possible in the regions where row-crops are very important. I personally, however, do not consider a general-purpose tractor as an ideal, and think that its significance consists largely in the fact that it accelerates the tractorization of agriculture during the transition period and helps to overcome the inertia of modern small-scale farming. A general-purpose tractor like a general-purpose cow, has no place under modern conditions of intense specialization. The main fault that I find with such a machine is that farmers on account of it will fail to avail themselves of the advantages of large tractors, as the general-purpose tractors are usually small. The ideal situation is when tractors are specialized, and such specialization will take place more and more as the average

size of the farm increases with the growing mechanization of agriculture. Even now, specialization is practiced on large farms.[8] In this connection it is interesting to note the tendency towards the manufacture of larger tractors. The following are figures for the United States:[9]

Size of Tractor	1927	1928
Wheel Tractors	*Number*	*Number*
Less than 25 belt H. P.	136,349	72,653
25 to 29 belt H. P.	17,275	23,087
30 to 39 belt H. P.	27,674	53,790
40 to 49 belt H. P.	2,840	1,865
50 and over belt H. P.	456	729
Totaled wheel tractors[1]	184,594	152,124
Caterpillar tractors	10,319	19,013
Production of all types	194,913	171,137
	Dollars	*Dollars*
Total value of output	129,369,024	161,461,462
Average value of a tractor	663.73	943.46

[1] Excluding motor cultivators and orchard tractors.

In 1928 the total production of tractors decreased on account of the cessation of the manufacture of Fordsons, but the total value of output increased because the average cost and power of the tractor increased almost by 50 per cent. Within the next five years the world production of tractors will probably reach half a million a year, with a total stationary horsepower of 20 millions.

According to the generally accepted view, a tractor can at the best reduce the cost of production, but cannot influence the yield per acre and the volume of farm production. The same opinion is held for the most part with regard to the combine. This view, however, does not correspond to the reality at all. A tractor, as well as a combine, and every other new machine which speeds up farm operations, inevitably leads to higher yields. Even if for the sake of the argument we should consider the quality of field work the same, whether tractor or a horse is used, which as a matter of fact we are not ready to admit, even then the greater speed of operation and more advantageous distribution of all field work must result in higher yields when tractors are used. Experiment stations in the United States have found that timely tilling and sowing are much more impor-

[8] See concerning this, my study, "The Organization of Large Farms in Germany," Moscow: Mezhdunarodny Agrarny Institut, 1929 (In Russian).
[9] Source: "Farm Implement News," April 11, 1929.

tant for obtaining good yields than even the technical quality of these operations. The tractor permits the nearest approach to the optimum time distribution of all field work, and in this manner helps to increase yields.

The picture of the technical transformation in American agriculture painted above leaves no doubt that we have here a real technical revolution. Even now as a consequence of the application of the new technique, the cost of production of wheat and corn can be reduced by half. This new agricultural technology has already passed the experimental stage and is being widely adopted by farmers, not only in the United States, but also in other countries competing on the world grain market, such as Canada, Australia, and Argentina. However, this new technique cannot be adopted without some disturbance, because it has first to overcome the inertia of the already crystallized economic institutions. Difficulties are caused by the fact that modern farming, due to its size, is incapable of adopting all the latest technical inventions; even the most elementary advantages of mechanization are beyond the power of the typical farmer, not to speak of his availing himself of the advantages of specialized tractors or large machinery.

When a tractor is bought by an ordinary farmer, he frequently does not gain thereby even a third of all the advantages which mechanization can bestow. The minimum arable area which is necessary for a profitable utilization of the smallest tractor is estimated in the United States at 80 acres, which, together with the pasture and meadows, might constitute 120-200 acres of improved land, plus an approximately equal acreage of unimproved land, would make a total of 240-400 acres of all land per farm. According to the last census, however, the average area per farm in the United States was estimated at 78 acres of improved land and 148.2 of all land; in Canada, 99.4 acres of improved land and 198.0 acres of all land. In this connection it must also be pointed out that in the United States 82 per cent of all the tractors are concentrated on farms of over 175 acres. This group constitutes only 18 per cent of the total number of farms [though roughly two-thirds of the total land in farms]. The other 82 per cent with an area of less

than 175 acres per farm have only 18 per cent of the total numbers of tractors.

The fact that the new technique is penetrating only into those sections of the agricultural industry which are better prepared to adopt the new methods and inventions, is the real cause of the agricultural depression. For it is precisely the competition of the sections adopting this new technique which is responsible for the low level of prices. Of course, the whole concept of "high" and "low" prices is highly relative. While prices may seem low to the ordinary American farmer, they may be very profitable for the larger mechanized farms which can produce wheat and corn at a cost of 30 to 40 cents below the average and here we find the main clue to the difficulties of the average farmer.

But what is the proper size of a farm under the new technical conditions? The minimum small grain area for an efficient utilization of a 16-foot or 20-foot combine is estimated at 480-1040 acres. With a harvesting period of three weeks, such a combine can harvest during the season from 750 to 1,000 acres of wheat alone, which together with other crops and fallow and pasture, would constitute a total acreage of approximately 1200-2500 acres per farm. But according to the census of 1925, the average acreage per farm in North Dakota was equal to 451.9 acres; South Dakota, 402.6; Nebraska, 329; Kansas, 263.6; and Washington, 172.1. Thus the combine alone requires an area from 5 to 8, and sometimes 10 times larger than that of the present average sized farm.

The new technology will inevitably require the enlargement of the farming unit, and this process has already begun. In western Kansas I was told that during the last few years in some districts the number of farms was reduced by half, while the average acreage has doubled. This is said to be true, also, of North Dakota. In Montana the experiment station has for a number of years carried on an investigation of a group of farms having tractors. The changes in the organization of these farms during a period of several years are very characteristic. Since the process of mechanization has begun, the average area under crops per farm has been

continuously growing, as will be seen from the following figures:[10]

Year	*Acres*
1924	598
1925	670
1926	812
1927	998
1928	1,265

The next agricultural census of the United States will undoubtedly show considerable changes in the number of farms and their size all over the country. In Canada the census of 1926 already showed the growth in the size of the farms in Alberta and Saskatchewan compared with previous censuses.

We must face then the question, how can such a readjustment be brought about? The only way is through an agricultural crisis, through the ruin of many small farmers the size of whose holdings does not permit them to utilize the new technique, whose place must be taken by larger units. The mechanics of the crisis must consist in the lowering of the prices of agricultural products, the cost of production of which becomes reduced through the introduction of the new farming methods. Some people in this country are waiting impatiently for the time when the price of wheat will at last rise and reach its pre-war purchasing power. Wheat prices, however, cannot rise. The conditions of wheat production in the principal countries supplying the world market are such as to lead one to forecast a further downward trend in the world wheat prices. The mechanized farms in the United States, Canada, Australia, and Argentina will continue to expand their acreage through the buying and renting of more land and the plowing of new areas. The flow of cheap grain to the markets of the world will increase with the growing mechanization of agriculture, and its pressure will lower the price of agricultural products. It is precisely in this manner that the new technique will conquer the agriculture of the new world. It is this invasion of agriculture by the large machines which explains the paradoxical fact of the stormy growth of agricultural production side by side with the wave of farm bankruptcies and the flight of the population from the farms.

[10] Source: M. L. Wilson, "The World Competition in the Wheat Production," in "Agricultural Engineering," May, 1929.

American economists have a great deal of confidence in their farmers and hope that under all conditions they will remain true to the soil and will somehow or other weather through the difficulties of the depression. Farming, write some economists, is not merely "a business," but a "way of life," "a mode of living."[11] This intimate character of farming, however, has not stopped the irresistible process which has decreased the percentage of the gainfully employed in American agriculture from 83.1 per cent in 1820 to 26.3 per cent in 1920.[12] And the end of this process is not in sight yet. The number of farms will inevitably be decreased still further. The time is not far off when most small farmers will find their farms unprofitable.

The approaching agricultural crisis in the first place will affect wheat farming inasmuch as the technical revolution has been most pronounced in wheat production. But the price of corn will probably also decline, because the cost of production can be considerably reduced through the use of the tractor, the corn planter, the cultivator, and mechanized harvesting. The lowering of corn prices cannot fail to affect pork prices. Finally, the large displacement of horses basically changes the feed situation, and this fact must influence the organization of productive livestock farming.

The present agricultural crisis is in its nature similar to that of 1875-1900. Both were caused by technical revolutions, but at the same time they differ in a number of essential respects. (1) At the root of the crisis of 1875-1900 was the transformation of the working implements which were adapted to the use of animal power. The present crisis, however, is caused primarily by a revolution in the source of power used in agriculture, which, in its turn, is producing a revolution in working implements. The consequential effects of the present crisis, therefore, will be much greater. It will affect in one way or another all the branches of agriculture in every country, and will produce not only

[11] See, for instance, E. R. Seligman's "Economics of Farm Relief," New York, 1929, p. 93.

[12] These two figures are of course not exactly comparable. For example, in 1820 farm women spent much of their time at home making clothes, canning food, making butter, etc. Yet they were not counted with those "gainfully employed." On the other hand, the women workers of 1920 who were performing these tasks in clothing factories, canneries, and creameries were so counted. EDITOR.

a revolution in the farm organization but also important social changes. (2) The present agricultural crisis following on the heels of an international deflation creating a sharp disparity between industrial and agricultural prices, gave in its very beginning indications of being a prolonged depression. (3) The crisis of the last quarter of the nineteenth century disturbed profoundly the whole European agriculture, and necessitated a considerable readjustment of the latter. The present crisis will not have such a violent effect on European agriculture, because Europe had long ago lost its purely grain character and became diversified. The main effects of the present crisis will therefore probably be localized in the countries of the New World. Nevertheless, the lowering of grain prices as well as the invasion of the new technique cannot fail to have some effect on European agriculture, and will probably require some changes in its organization. (4) The agricultural crisis of the Seventies and Eighties of the last century ruined not only European grain farming, but also thousands of American farmers, the organization of whose farms did not correspond to the requirements of the new technique. The growth in the size of the farms and the ruin of smaller farmers played an important rôle in the mechanics of the former crisis, but in the main its predominant aspect was a geographical one—the struggle of American agriculture with European; and in the United States, the struggle of the western wheat with the eastern, the agricultural expansion of the West where the new farms which were being established were at once adjusted both in size and technical equipment to the new technological requirements.

In the present situation geographical shifts will also play a part, and they have already begun. Thus, in the United States there is observed a shift of the wheat and cotton crops westward, and the concentration of corn in the Corn Belt. There is also taking place a considerable plowing of grass land and even a little clearing of unimproved land. But the geographical shifts in agriculture at present are not occasioned by the improvement in transportation, which was of such crucial importance in the last century. Transportation costs since the war have as a rule not decreased,

and in the majority of cases have even increased. There is also no strong demand for cereals to stimulate a geographical expansion of agriculture as in the nineteenth century. Therefore, geographical expansion will play a secondary rôle in the present depression and the force of the new technique, finding no substantial outlet in this factor, will exert a far stronger pressure on the existing agricultural organization than in the past. While during the former crisis the growth in the size of the farms took place simultaneously with an increase in their number, the tendency now must be towards the reduction in the number of farms, and here we find the center of gravity in the present crisis.

The competitive process in agriculture will result, first of all, in the enlargement of the more successful farms through the purchase and renting of land. The use of the combine alone necessitates, as was pointed out above, an increase in the size of the typical farm from three to five times, and in some cases even 10 or more times. And when several combines, tractors, and specialized machinery are used, the typical farm will have to be many times the size of the present average farm.

However, the increase of the individual farm is not the only possible method of the integration of the farming unit. The technical revolution will undoubtedly provide a strong impetus towards the spread of corporation farming. Even now this type of large-scale farming accounts for about 6 per cent of the total gross income from agricultural production of the United States. Judging from the statistics of income published annually by the Bureau of Internal Revenue, many of these corporation farms are very successful. The reasons which make the development of corporation farming inevitable can be briefly summarized as follows:

1. An individual farmer has a great deal of difficulty in providing or procuring the capital which is necessary for the equipment of a farm anywhere near the optimum size, the cost of which varies from $50,000 to as much as $500,000.

2. The technical revolution has just begun, and the capital requirements of an efficient farm unit will undoubtedly increase during the later stages of the present technical

development. The growing tendency to use special equipment and machinery instead of general-purpose machines increases the advantages of large-scale farming, and provides a new stimulus for the growth of corporation farming.

3. Finally, large-scale production demands such a high executive and organizing ability for its direction that the ordinary individual farm-proprietor is not able to supply it.[13]

To summarize the comparison between the present agricultural crisis and that of 1875-1900, we see that they both form entirely legitimate stages in the history of the capitalistic economy. Two technical revolutions follow one after another within the span of half a century, and both cause an agricultural crisis. Each of these revolutions is in its turn prepared by the preceding industrialization, the development of the division of labor, and of productive forces.

These waves of technical change first in manufacturing industry and then in agriculture, are not cycles in the sense in which Professor N. D. Kondratieff uses the term in his theory of "long cycles."[14] A cycle means fluctuation within the frame-work of a fundamentally unchanged system, while in the cases we are considering, each new wave of technical change results in the shifting of the economic system to a new, qualitatively different, stage of organization and technique, with a resulting number of important socio-economic changes. The waves of technical progress must be interpreted not as cycles, but as phases of an irreversible historical process of the development of productive force which is proceeding by jolts and is accompanied by crises. It is precisely this undulatory character of the technical progress which enables agriculture to overcome the usual lag in the development of productive forces as compared with the manufacturing industry; it is also the cause of the long-time disparity between the prices of agricultural and industrial products on the world market.

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[13] An interesting transition stage between family and large capitalistic farming is the so-called "group management" of individual farms. This system, which is rapidly developing, aims at the introduction of some form of supervision over the tenants by qualified trained executives, and thus affords at least some scope for the use of administrative ability and technical training in present day farming.

[14] "Die lange Wellen der Konjunktur," in Archiv für Sozialwissenschaften und Sozialpolitik, 1928.

The attempt which is frequently made to explain the movements of prices on the world market by the Law of Diminishing Returns must be considered entirely unsuccessful, for at the root of it there is an unproved assumption that each unit of the agricultural product can be obtained from a certain area only through increased expenditure of labor and capital. This formulation, however, is qualified by the statement that it is true only, "other things being equal." But when the principle of diminishing returns is used to explain the long-time movement of agricultural prices, then by that very fact there is postulated the unchangeability of the agricultural industry and the impossibility of technical progress in agriculture. Now, the whole history of agriculture from the days of Ricardo, who first clearly formulated the Law of Diminishing Returns in agriculture, to the present time, has been a complete denial of this assumption. On the contrary, it was precisely the technological progress which was the main cause of progress in America and European agriculture. Only if we adopt this point of view can we offer a satisfactory explanation of a number of phenomena in the geography and history of agriculture.

Ricardo and Malthus and a number of their contemporaries formulated the Law of Diminishing Returns a hundred years ago when there was not even an iron plow. It is still a mystery to me how a generalization of this kind can find support to-day when we observe such enormous achievements in scientific agriculture, agricultural chemistry, applied botany, and have before our eyes synthetic ammonia, a tractor, a combine, and unlimited possibilities of further scientific discoveries in agriculture.

In conclusion, a few words must be said concerning the significance of the present technical revolution in agriculture for countries like China and India, which are very little industrialized and suffer from the so-called agrarian over-population. The only weapon which these countries possess for competition on the world agricultural market is cheap labor. But we can see how this defensive weapon is in the end turned against themselves. The agriculture of a country in which technical progress is being retarded is

inevitably bound to stagnation and retrogression. Those who do not move forward are inevitably pushed backward.

The latest stage in the development of the rice-growing industry supplies a very good illustration of what we have just said. For centuries the cultural methods of growing rice remained unchanged. The cultivation of rice requires an enormous amount of human labor, and therefore it was localized largely in countries where cheap labor was abundant. But it was only necessary for Americans to apply to the cultivation of rice, the ordinary technical equipment of wheat growing, i. e., plows, seeders, and binders, and this highly labor-intensive culture ceased to be labor-intensive and became commercially profitable in such a region as California where wages are many times higher than in China, and we have actually observed during the last few years how American rice competes with Asiatic rice on the world market. What but a further lowering of the standard of living can a Chinese or Indian peasant expect, should the United States by utilizing the tractor, the combine, and perhaps even the aeroplane, expand rice production with the resulting reduction of the world price?

If we think this over, we will appreciate better the efforts of Soviet Russia to raise the technical level of its agriculture to that of the technologically more advanced countries. Especially fruitful in this connection is the recent scheme for the organization of machinery-tractor stations, with a view to supplying mechanical draft power on a large scale to a number of small peasant farms, combined into a single farming unit. Thus it will perform the same function for agriculture that a central electric power plant supplying power to a whole net of factories performs for industry. The machinery-tractor stations will make possible the penetration of the tractor and other large agricultural machines into the solid mass of the small-scale peasant agriculture.[15]

An objection is often made to the efforts to mechanize Russian agriculture—"What will become of the surplus labor?" We can only say that either this surplus labor will be able to find an application in the new developing

[15] See: A. M. Markevich, "Intervillage Machinery-Tractor Stations," Moscow: Planoroe Khoziaisto, 1929. (In Russian)

branches of industry and agriculture or it will adhere to the old farming routine and will systematically suffer from every advance of the agricultural technique in the new world. Furthermore, the concept of "surplus labor" is very vague. In Russian agriculture this surplus is to a very considerable extent a seasonal one, being usually absorbed completely during the critical periods of farm work, particularly during the harvest. A backward agricultural technique binds to the soil for short seasons a large labor force and leaves most of it without employment during the rest of the time. Only mechanization will permit a radical improvement in the seasonal distribution of work on the farm by smoothing the critical periods and thus will readily give an opportunity to a part of the agricultural population to develop new branches of agriculture and industry.

THE ASSESSMENT SYSTEM OF MINNESOTA IN ITS RELATION TO EQUALITY OF TAXATION[1]

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Inequality of tax burden in a state may arise from many different sources. Some of it may come from different rates in different governmental subdivisions, from taxes that are either progressive or regressive in structure or incidence, from exemption of certain kinds of property at the expense of the rest, or from failure to recognize or tax any sources of ability to pay besides the ownership of property. In our society an individual can and often does possess more than the average amount of income with less than the average amount of property. In a state where there is no income tax such a person may pay little or no direct taxes. Inequalities fully as serious as any arising from causes mentioned above might occur through lack of accurate and thorough assessments of real and personal property where the general property tax is an important part of the tax system. Personal property generally and intangible personalty in particular often are not assessed at all, either from failure on the part of the owner to declare it or failure on the part of the assessor to call on the owner or inspect the property. When the property is assessed, the value set upon it depends on the judgment of the assessor, which in turn depends on his ability, training, and time and facilities for doing good work. Obviously, if the tax rate is sixty mills on the dollar and one man's property is valued at half that of another, although true values are the same, the effect is to tax the first man's property at the rate of thirty mills on the dollar at a proper valuation if the property of the second was assessed correctly in the first place.

The discussion in this paper is confined to the subject of possibilities of inequality arising from the assessment system in Minnesota. From the nature of the problem little can be accomplished in an attempt to study the accuracy of

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assessment of personal property. The lack of any measure by which to judge assessed values and the impossibility of ascertaining how much personal property escapes assessment each year give little hope of results in this direction. It happens, however, that Minnesota offers a particularly good field for the analysis of its assessment system insofar as it concerns real estate. The State Tax Commission has kept a record of bona fide sales of real estate in Minnesota since 1914, using all cases where the consideration was stated in the deed. The records of the Commission furnished the materials on which this study was based.

Minnesota, like most states, places much reliance upon its general property tax as its principal source of revenue. Out of a total revenue for state and local purposes in 1928 of about $154,000,000 the tax on general property produced about $120,000,000, or approximately 78 per cent. A uniformly low rate of three mills on the dollar is applied to money and credits and this yielded $1,270,000. Inheritance taxes brought $1,700,000; motor vehicles, $10,072,000; and the gasoline tax, $6,212,000. The remainder came from a variety of business and corporation taxes, including an occupation tax on mined iron ore. Because the general property tax is so large a part of the total and is preeminently the tax paid by private individuals it is important that assessments be reasonably accurate. If not, great inequalities are sure to arise from differences in valuation. A great deal might be said as to the advisability of using the possession of real and personal property as almost the only basis for the payment of taxes on the part of the individual, but it is not the purpose of this paper to go into that question. Consideration will be given here only to possibilities of inequality arising from inaccurate or biased assessments of real estate.

Assessments in Minnesota are on the township basis except in cities and villages. The township assessor is elected for a term of two years, receives four dollars a day while actually engaged in assessing, and does his work during the months of May and June. Personal property is assessed every year; real estate every two years. Assessments are subject to review and equalization, first by the township

board of supervisors, then by the county commissioners, and finally by the State Tax Commission. All of these boards have the power to revise the assessments of individuals. The county board may raise the assessment of an entire township if it thinks that the average assessed valuation per acre is too low. The State Tax Commission may revise the assessments of individuals, townships, or counties and does so whenever it thinks proper.

It was found advisable for the purposes of this study to make comparisons by districts rather than to take the state as a whole because of wide differences existing between different parts of the state. The districting used was one adopted by the Division of Agricultural Economics of the University of Minnesota, and is based on differences in the types of agriculture to be found in various parts of the state. A method of districting suitable for a tax analysis should be based on differences in value per acre. It was found in the course of this study that values per acre were reasonably uniform within each of these districts, although they varied considerably between districts. District I comprises that part of the state which has been settled longest and has the largest population. It is by far the most important dairy section. District II is on the whole the best agricultural region. It is the corn and hog area. The surface is in general quite level and the soil is rich. Districts III and IV are less distinct and are harder to characterize. District III is rougher and more wooded than District II. It tends even more to diversified farming. Dairying, the raising of corn, hogs and beef cattle, and the growing of small grain are well represented here. If District III represents a transition from the two southern districts to the grain area of the Red River Valley, District IV tends to combine their characteristics with those of the cut-over section to the north and east. It has very many lakes, a good deal of sandy soil and is a small grain, potato and dairy region. District V is the Red River Valley, long famous for wheat, and now becoming famous for potatoes. District VI is the cut-over region which includes within its confines the Iron Range, known the world over for its iron ore. Agriculturally, it is hesitating between farming and

reforestation. Figure I shows the location of these districts.

The first approach to the analysis of assessments was made by comparing the true and full assessed values of 577 farms in District I with their corresponding sales

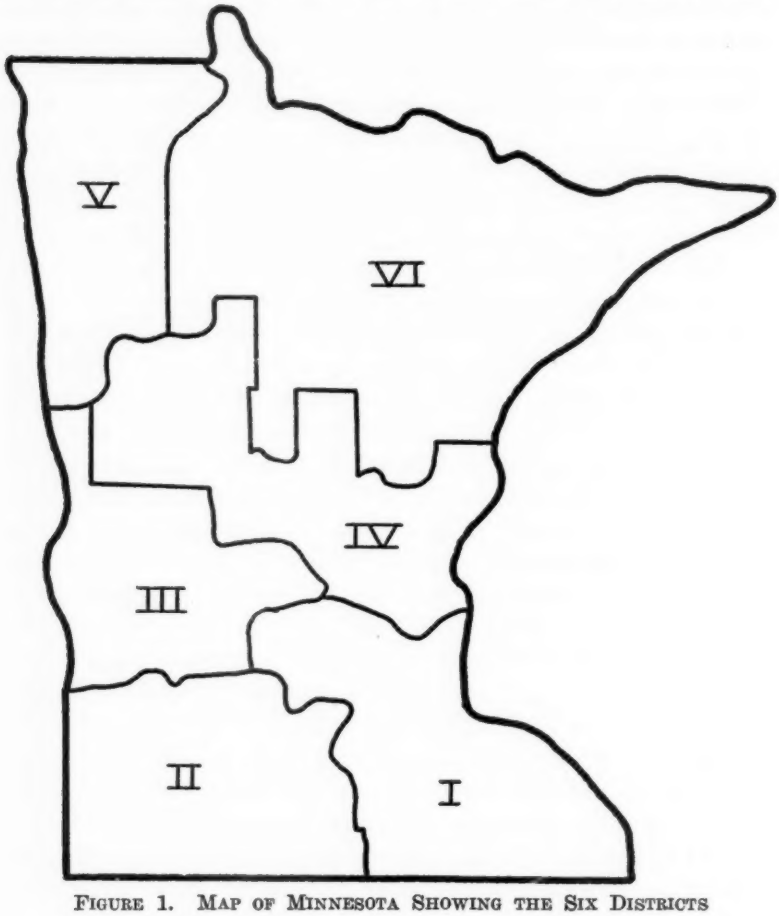

FIGURE 1. MAP OF MINNESOTA SHOWING THE SIX DISTRICTS

values. Because Minnesota law provides that unplatted real estate shall be assessed at one third of its fair market value and that platted real estate shall be assessed at 40 per cent of its fair market value, assessed values of unplatted real property were multiplied by three and the assessed values of platted property by two and one half to arrive at the true and full assessed value for comparison with sales

TABLE 1. SALES VALUE OF FARMS AND CORRESPONDING PERCENTAGE OF ASSESSMENT IN DISTRICT I. (SEE FIG. 1). INCLUDES THE FOLLOWING COUNTIES: FILLMORE, OLMSTEAD, WABASHA, STEELE, DAKOTA, McLEOD, CARVER, FREEBORN, RICE

Per Cent Assessed is of Sale Value

Sale Value of Farm	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	Totals	Mean	σ	σ/M100
45								1																				
40							1																		46	77.0	13.93	18.09
35								1		1																		
30								3	3	5																		
25					1	1	9	7	6	3	4																	
20				1	3	4	16	18	16	14	8	4	1												85	81.1	18.03	22.23
15					1	8	11	26	21	25	21	4	4	6	1										128	89.2	20.33	22.79
10						8	18	24	35	25	23	17	18	8	6	3		1							186	96.6	24.53	25.39
5			1	2	1	4	11	19	24	9	12	13	14	6	3	4	1	4	1	2	1				132	101.6	34.42	33.87
0																												
Totals			1	3	6	26	70	97	108	76	68	38	37	20	10	7	1	5	1	2	1				577	92.3	25.69	27.83

values. A correlation table was then prepared as shown in Table I. The vertical scale shows sales values in thousands of dollars, the horizontal scale the percentage that true and full assessed value is of sale value. When sales are so arranged, the rather uniform and constant tendency of assessors to assess high value farms at a relatively low percentage of their sale value and low value farms at a high percentage appears. As the table shows, 132 farms selling for less than $5,000 each were assessed on the average at 101.6 per cent of their sale value. Of farms selling between $5,000 and $10,000, there were 186 assessed at 96.6 per cent of their sale value. The 128 farms between $10,000 and $15,000 in sale value were assessed at 89.2 per cent. The highest group, composed of 46 farms selling for sums between $20,000 and $45,000 were assessed on the average at 77 per cent of their sale value. Another feature of the table is the very wide range of assessments, running from 25 per cent of sale value to 205 per cent of sale value in the lowest group, which consists of those farms that sold for less than $5,000 each. The next two groups above, although their numbers are approximately the same or larger, show noticeably less range. The standard deviations and coefficients of variation of each group likewise tend to become smaller as we go from the groups of lower value farms to those of higher value. The table gives the number of farms, the average assessment percentage, the standard deviation, and the coefficient of variation for each group for purposes of comparison. The coefficient of variation, which is the standard deviation taken as a percentage of the mean, is used as the measure of variation because it takes into account the fact that a given amount of variation is of greater significance where the mean is small than where it is large.

Farms may differ in value either because of the number of acres they contain or because of differences in value per acre; and bias on the part of assessors might attach to one characteristic or the other or to both. The next step in the analysis was to set up another table in which the number of acres in the farm was measured by the vertical scale while the horizontal scale remained the same as before. When

TABLE 2. FARMS GROUPED ACCORDING TO NUMBER OF ACRES. DISTRICT I.

Per Cent Assessed is of Sale Value

Size of Farm in Acres	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	Totals	Mean	σ	σ/M100
360																												
320										2	1																	
280							1		1																14	85.0	11.96	14.07
240											1	1																
200							1	2	3		1																	
160						1	6	15	13	14	14	8	3	6	3	1									84	97.3	22.33	22.95
120				1			11	6	12	7	9	5	6					1							58	91.9	22.75	24.76
80					2	11	21	37	41	33	27	11	15	5	3	4	1	1		1					213	92.4	24.78	26.82
40			1		3	11	18	25	26	17	14	12	10	6	4	2		3		1					153	92.5	29.04	31.39
0				2	1	3	12	12	10	3	2	2	3	3					1		1				55	85.5	31.70	37.08
Totals			1	3	6	26	70	97	108	76	68	38	37	20	10	7	1	5	1	2	1				577	92.3	25.69	27.83

TABLE 3. FARMS GROUPED ACCORDING TO VALUE PER ACRE. DISTRICT I.

Per Cent Assessed is of Sale Value

Value per Acre	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	Totals	Mean	σ	σ/M100
325								1																				
300										1															42	67.1	11.45	17.06
275						1		2			1																	
250								5	1	1																		
225					2	7	9	8	3																			
200					1	7	8	2	4	2															97	73.5	17.20	23.40
175				2	1	8	18	20	12	8	1	1	1		1													
150					1	2	12	29	17	15	13		1	1											91	83.6	15.09	18.05
125						2	8	26	40	30	23	7	6	1											143	90.5	15.41	17.03
100			1	1			3	7	19	13	20	17	17	7	2	1									108	103.7	21.86	21.08
75							4		5	4	9	9	9	8	6	5	1	4	1	1	1				67	124.6	31.07	24.94
50								4	6	3	2	3	2	3	1	1		1							26	110.9	30.33	27.35
25												1	1								1				3			
0																												
Totals			1	3	6	26	70	97	108	76	68	38	37	20	10	7	1	5	1	2	1				577	92.3	25.69	27.83

this was done with the same 577 farms, the 55 farms of less than forty acres and the 14 farms having two hundred acres or more were all assessed on the average at 85 per cent of their sale value, there being almost no difference between the two groups. Three groups of farms in between, the 40, 80, and 120 acre groups, averaged about 92 per cent for each. The average for the 160 acre group was a little higher, 97 per cent. There would thus seem to be little connection between the number of acres in the farm and the percentage of assessment. There does, however, seem to be a tendency for the coefficient of variation to become smaller as the number of acres increases. The final step in this part of the analysis was to set up a third table with the percentage that true and full assessed value is of sale value on the horizontal scale, using the vertical scale to measure differences in value per acre. On this basis the 577 farms show very marked differences in percentage of assessment as between the lower and higher groups. The 29 farms selling for less than $50 per acre were assessed at 110.9 per cent of their sale value. The group having a sale value between $50 and $75 per acre had the highest average percentage of assessment, 124.6 per cent. The lowest percentage of assessment, 67.1 per cent attached to the farms having the highest value per acre, 42 farms which sold from $200 to $325 per acre. The highest coefficients of variation were found in the two groups having the lowest values per acre, but the reduction in the size of the coefficient was neither uniform nor noticeable. The group of 97 farms having sale values from $150 to $200 per acre had a coefficient of variation in the percentage of assessment of 23.40. The coefficient of the lowest group was 27.35, and of the next 24.94.

Thus it appeared as far as District I was concerned that there was a distinct and uniform tendency to under assess high value farms and to over assess low value farms and that this tendency arose not from any marked bias in connection with the number of acres in the farm, but rather because assessors showed a very strong disposition to undervalue acres with a high sale value and to overvalue acres with a low sale value. It was next important to as-

certain whether this situation was not largely local, accidental, or temporary, or a combination of the three. Land values have been very unsettled since the war. The agricultural depression has produced a decline that is still continuing. Compared with pre-war conditions sales are relatively infrequent and therefore it is often difficult to determine what the market values for land are in a given locality. Although the state law requires assessors to appraise at a fair market value, actual sale values do not always furnish an absolute standard. The field men who collect sales data for the tax commission are instructed to omit forced sales, sales between relatives, and trades. Even with this selection there will still be a certain amount of error to be reckoned with in using any given sale as an indication of fair market value. Judgment of values and bargaining ability differ greatly among individuals and often cause a piece of land to sell for more or less than what might properly be considered its fair market value. With these considerations in mind, the entire state was analyzed. The six districts before mentioned differ very widely in soil, topography, climate, type of agriculture and general economic conditions. Large samples of sales were taken from every district. In each case sales for the two-year period 1926 and 1927 were compared with a similar number of sales for 1924 and 1925. Finally, results in Districts I and II for 1924-25-26-27 were compared with an analysis of sales and assessed values for the two pre-war years, 1914 and 1915. The results were remarkably uniform and consistent. In every two-year period sampled, and in every part of the state, there was the same undervaluation of high value land and overvaluation of low value land. There was also the same wide range of assessment and tendency toward high standard deviations in each group. No allowance for error can quite justify this very evident bias or excuse a range in the ratio of assessed to sale value of from 25 per cent to 195 per cent in distributions involving as many as three hundred sales. The table below summarizes results in the six districts when the distributions are arranged on the basis of value per acre.

TABLE 4. RATIOS OF TRUE AND FULL ASSESSED VALUES PER ACRE TO SALE VALUES IN MINNESOTA, 1924 TO 1927 INCLUSIVE

	Sale Value per Acre	*Number of Farms*	*Ratio of Assessed Value to Sale Value* %
Dist. I	$200 and above	42	67.1
	$150 to $200	97	73.5
	$125 to $150	91	83.6
	$100 to $125	143	90.5
	$ 75 to $100	108	103.7
	$ 50 to $ 75	67	124.6
	$ 0 to $ 50	29	110.9
Dist. II	$175 to $300	50	61.8
	$150 to $175	98	72.3
	$125 to $150	252	79.0
	$100 to $125	362	88.5
	$ 75 to $100	240	100.1
	$ 50 to $ 75	75	119.7
	$ 25 to $ 50	23	124.6
Dist. III	$125 and above	47	63.9
	$100 to $125	95	71.0
	$ 75 to $100	150	83.6
	$ 50 to $ 75	160	94.9
	$ 0 to $ 50	91	126.1
Dist. IV	$100 to $175	50	63.8
	$ 75 to $100	73	69.1
	$ 50 to $ 75	140	74.1
	$ 25 to $ 50	218	82.8
	$ 0 to $ 25	222	109.0
Dist. V	$ 75 to $175	40	65.5
	$ 50 to $ 75	83	77.8
	$ 25 to $ 50	152	90.7
	$ 0 to $ 25	111	106.1
Dist. VI	$ 50 to $110	29	43.6
	$ 40 to $ 50	18	49.4
	$ 30 to $ 40	44	64.3
	$ 20 to $ 30	70	71.7
	$ 10 to $ 20	143	97.5
	$ 0 to $ 10	42	122.9

The same general results are found in 1914 and 1915 as in the later years. In District I for the pre-war period, 17 farms in the group having the highest values per acre were assessed at an average of 55.6 per cent of their sale values. The next lower group, 54 farms, at 63.5 per cent. For the 38 farms lowest in value per acre, the percentage that assessed value was of sale value was 125.8 per cent. In District II the percentage was 66.0 per cent for the highest group and 126.7 per cent for the lowest group on the basis of value per acre.

Turning next to platted property to see how it fared, 1662 sales of platted property from eighteen counties for the years 1926 and 1927 were thrown into a distribution. The results are shown in Table 5.

TABLE 5. PERCENTAGE TRUE AND FULL ASSESSED VALUE WAS OF SALE VALUE FOR 1662 SALES OF PLATTED PROPERTY, 1926 AND 1927

Number of sales	83	63	107	184	254	359	612
Sale Value	Over $6000	$5000 to $6000	$4000 to $5000	$3000 to $4000	$2000 to $3000	$1000 to $2000	Under $1000
Percentage	65.7%	75.2%	70.8%	74.7%	84.2%	84.0%	93.7%

The range in the ratio of assessed to sale value was from 5 per cent to 255 per cent. The average of the distribution was 79.7 per cent and the standard deviation was 35.61. Thus the assessment of real estate in the villages and smaller cities is as poorly done as the assessment of farm real estate.

Table 6 gives the average percentage that true and full assessed value was of sale value in each district for both platted and unplatted real estate in 1914 and 1915 and also in 1926 and 1927. In the latter period farm real estate was assessed relatively higher than city and village real estate in all districts. It should be remembered in this connection that the Minnesota assessment law of 1913 provides for the assessment of unplatted real property at 33⅓ per cent of its sale value and for the assessment of platted property at 40 per cent of its sale value. The higher valuation for urban real estate was established to conform with earlier practice and to permit cities and villages to avoid conflict with laws setting an upper limit on tax rates in municipalities. The comparisons in Table 6 are on the basis of true and full assessed values.

The table makes it plain that the assessment system functioned in 1926-27 in such a way as to more than eliminate

TABLE 6. PERCENTAGES OF ASSESSMENT OF PLATTED AND UNPLATTED REAL ESTATE COMPARED FOR 1914-15 AND 1926-27

	1914–15			1926–27		
	Unplatted	Platted	Difference	Unplatted	Platted	Difference
	%	%	%	%	%	%
Dist. I	81.1	77.9	3.2	84.7	73.7	11.0
Dist. II	79.8	80.0	−.2	84.2	78.4	5.8
Dist. III	79.7	82.0	−2.3	85.8	71.0	14.8
Dist. IV	80.5	83.2	−2.7	73.3	71.5	1.8
Dist. V	86.0	86.4	−.4	87.0	74.9	12.1
Dist. VI	92.6	82.3	10.3	67.5	61.0	6.5

the apparent favoritism of the law. The situation was different in 1914 and 1915 when the law first went into effect. In those two years unplatted real estate was favored in all districts except I and VI. Another interesting feature of the table is the change it indicates in District VI. Assessed values were high there in 1914 and 1915. In the later period they are the lowest in the state in relation to sale value. District VI was much more prosperous in the earlier period. The timber that formed a large part of its wealth then has since disappeared. Although reducing the level of assessments would not reduce the total of local taxes that must be paid, it would help to lighten the load of state taxes. However, real estate values in District VI have been so uncertain since the war that little importance can be attached to the seeming change in assessment policy in this district. In a region under development with its future possibilities largely unknown, sale values of land are likely to be based more on hopes than on present income.

Another matter of importance in connection with the problem is the trend of assessments over the period of fifteen years included in this study. In thirty six counties studied from this point of view, assessed values per acre rose less rapidly than sale values during the period of inflation and fell more slowly during the period of deflation. In four counties out of the 36, true and full assessed values per acre were higher than sale values in 1926-27. In thirteen more counties assessed and sale values were closer together at the end than at the beginning of the period. Trends were markedly different in the northern counties from those in the southern. In all of the better agricultural counties for which trends of values were graphed, sale values rose to a peak in 1920 and fell rapidly afterwards. Sale values in the cut-over counties were not greatly affected by the boom so that sale values in 1920 were not notably high there. In several counties values continued slowly and steadily upward to 1927. In all six of the counties sampled in District VI, true and full assessed values and sale values were practically the same, on the average in 1914, while 1927 shows a decided divergence with assessed values about the same as

in 1914 and sale values considerably higher than at the earlier date.

To sum up, inequalities of assessment were found to be of at least three kinds: Inequalities between individuals as indicated by the range in the percentage of assessment for any group sampled; inequalities between groups by means of which the higher value groups of farms on the average bear a lighter burden of taxation in relation to their sale value than the lower value groups of farms; and, finally, inequalities between platted and unplatted property. All of these inequalities exist in spite of the elaborate machinery for equalization existing in the state. It should be emphasized that these results appear after the more outstanding errors of assessment have been corrected by the local boards and the Tax Commission. Evidently, if the task of assessment is not well performed in the first instance, later correction is difficult and uncertain.

It is not by any means easy to account for all the conditions found in this study. The great inaccuracy indicated by the very wide range of assessments can be laid largely to the fact that the assessors are men untrained in appraisal work, poorly paid, and very restricted as to time. The task of valuing real estate with only a small percentage of error is a highly technical one, in the performance of which even the best trained men may make many mistakes. The presence of the marked bias noted in all groups of assessments both before and after the war in all parts of the state offers a more interesting problem for speculation. As shown previously, the assessor is apparently not overawed by the fact that farms are large. He treats them about the same, whether large or small. But when values per acre are high, regardless of the number of acres, he scales the values down, and when they are low, he boosts them. Assessors are forbidden by law and by the Assessors' Manual to value property according to an average. But the tendency to use average values is very strong. In the original data of sales, a good many instances were found of farms near each other valued the same by the assessor but selling for very different prices. Any tendency to value farms at an average figure would have the result of undervaluing high value

farms and overvaluing those of low value. The results of this study show plainly that there has not been enough discrimination between good acres and poor in the assessment process. A cause of error in determining acre values might arise from a failure to assess improvements accurately. Valuing buildings and other improvements is a matter of great difficulty. Being attached to the realty, their sale values cannot be calculated separately, nor can cost of construction furnish a safe guide to value. Cases of farms selling for less than the cost of the improvements have frequently occurred. The farm must be valued as a unit, at the same time giving proper weight to its component elements of value. Assessors might easily fall into the error of undervaluing well improved places and of overvaluing those less improved. Another possible source of bias lies in an apparent tendency to assess the property of non-resident owners at a somewhat higher rate than that of residents. On the average, it seems fair to say that the farms of non-residents have fewer improvements and are not so well kept up as the farms of resident owners, thus giving rise to low sale values. A tendency to place high assessed values on such farms would contribute to the results shown in the tables accompanying this article. It has sometimes been alleged that assessors are not as capable of judging the values of large properties as they are of small. The present analysis hardly bears out that conclusion. The distributions are on the whole more normal, and standard deviations are smaller with high value properties than with low value ones. It is in the lowest groups that the range in the percentage of assessment becomes particularly appalling. Probably some tendency toward favoritism and deference to the prosperous enters in. All in all, there seems little doubt that the assessment system in Minnesota can be improved greatly.

RESEARCH IN LOCAL AND NATIONAL OUTLOOK WORK[1]

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Discussions of research usually begin with the consideration of objectives. So let us begin this discussion with the question: What is the purpose of outlook work? The purpose of outlook reports, national, state or local, any of us would say, is to make available to farmers information which they can use as a guide in planning their production and marketing programs. A question that naturally follows is: What information do farmers in a particular area or locality need in order to do their planning most intelligently? The answer that most of us economists would give at first thought is: Information that will make it possible to form an intelligent judgment as to prices that may be expected at marketing time for the commodities to be produced.

Information dealing with prospective prices is not by any means the only type of information which has a bearing on outlook work. But since price information is a type of information associated in the minds of most people with outlook work and outlook reports let us discuss it first. An important point to be kept in mind throughout the discussion is that producers are primarily interested in prices to be expected *at the farm or at the local market* for the grades and qualities of the commodities they produce. It is this price rather than the price at a distant market which directly affects a farmer's income.

For example, a potato grower in Colorado in the spring of 1931, when deciding on the acreage of potatoes to plant will need to estimate what the price at his farm will be in the fall and winter of 1931, for the grade and quality of potatoes he may reasonably expect to produce. A poultryman in Washington when deciding on the size of flock to keep next year and how to feed and manage it needs information that will enable him to estimate accurately prices at

[1] Paper read at fourth annual meeting of Western Farm Economics Association, Logan, Utah, June 10, 1930.
[2] Paper No. 12. The Giannini Foundation of Agricultural Economics.

his farm for the grade and quality of eggs he expects to market. A cattleman when making his plans as to how large a breeding herd to keep and at what age to sell his young stock needs information that will give him an accurate indication of the prices at his ranch one to four years in advance for calves, yearlings, two year olds, and three year olds, of the grade and quality he can produce. An orchardist when considering the advisability of new plantings must endeavor to look five to fifty years into the future to see what prices he can expect at his orchard or at a local packing plant for the kind and quality of fruit he expects his orchard to produce.

Generally speaking we may say that research in this phase of outlook work should be such that the results will aid one in judging the future course of prices of the different grades and qualities of a commodity in the different areas and localities where it is produced. Research that will be helpful in judging the future course of prices must necessarily be based on records of the past and we may say that the objective of price research to be used in outlook work is to measure the factors that have influenced or affected local prices of the products grown in an area.

What is the best way to organize this research and what agencies are equipped and qualified to conduct it? Take as a specific example, ranch cattle in eastern Wyoming. Stated qualitatively the research problem is: What factors have influenced the prices of the different classes and grades of cattle sold from that area in past years? Stated quantitatively, the problem is to measure in dollars and cents the effect of each of the factors on the price per herd or per pound received by the cattle producers of the area.

The price of a particular class and grade of cattle in this area, as in other areas, is dependent to a large extent on the price at the terminal markets, and the study of factors affecting local prices in eastern Wyoming might be divided into two parts: (1) the measurement of factors influencing prices at the terminal markets, and (2) measurement of the factors influencing the spread between prices at the terminal markets and prices in eastern Wyoming.

The results of an analysis of prices at central markets would be useful and helpful in all producing areas. Data,

national or international in scope, are needed for such a study. Thus, this phase of the research is primarily within the province of a national agency such as the Federal Bureau of Agricultural Economics. It seems that progress will be most rapid if that institution takes the lead in research dealing with factors affecting the central market prices of agricultural commodities. On the other hand, the measurement of the differentials between central market prices and prices in particular localities is a problem of primary interest to the localities being studied and this phase of the research falls logically within the province of the state colleges and experiment stations. To revert to our example of prices of cattle in eastern Wyoming and confining our discussion to a single class of cattle, say three year old grass fat steers, a logical organization of the research would be: (1) a determination by the Bureau of Agricultural Economics of the factors that have influenced the prices of three year old grass fat steers at a central market, say Omaha, over a period of years and the measurement of the effect of each factor; (2) determination by the Wyoming Experiment station of (a) the spread that existed between the price at Omaha and the prices at the ranches or the local markets in eastern Wyoming for the same years, (b) the factors responsible for this spread, and (c) the quantitative effect of each factor. If all of this research were completed the economist would be able to explain the variations in prices that producers in eastern Wyoming have received in past years for three year old grass fat steers and the explanation, if understood by producers, would be very helpful to them in appraising current conditions in any year and arriving at an accurate estimate of the prices to be expected in future years.

As another example, take the prices received for wheat by wheat growers in California. The grade and quality of most of the wheat produced in California is very similar to that of the wheat produced in Oregon and Washington and it seems reasonable to assume that the price of California wheat would be dependent to a large extent upon the terminal market prices of wheat in Washington and Oregon, that is, prices at Portland or Seattle. Preliminary analysis has shown that producers' prices for wheat in California are

related more closely to prices at Portland and Seattle than to wheat prices in any of the other important central wheat markets in the United States. Since an analysis of wheat prices at Portland and Seattle would be useful and helpful in most of the western states we hope that the Bureau of Agricultural Economics will be able to undertake this part of the research, and that efforts at our institution can be devoted to finding and measuring the factors that have determined the differentials between prices in California and prices at Portland or Seattle.

At the present rate of progress, it will require many years for the Bureau of Agricultural Economics to analyze the central market prices of all agricultural commodities. The need for results may be so pressing that some of the state institutions will find it advisable to undertake studies of central market prices of some commodities but the problem of measuring and analyzing differentials between central market prices and local prices is of equal importance in the further development of outlook work and doubtless progress will be most rapid if the state agencies give their primary attention to this phase of price analysis.

Research on the prices of all the different agricultural commodities conducted in the manner here suggested would require much information not now available, on (1) prices at terminal markets, (2) prices in local markets, (3) production, (4) supplies, (5) the demand for specific products and (6) the factors responsible for the differentials between central market prices and local prices. This phase of the subject is covered in an excellent way in a paper presented by Dr. Stine at the last meeting of the American Farm Economics Association and published in the January 1930 issue of the Journal of Farm Economics. Also, much remains to be done in developing the technique of price analysis. There have been remarkable developments in technique in the past few years due to the excellent work of Ezekiel, the Working brothers, Bean, Waugh, Pearson, and many others. But all price analysts feel the need for further refinement and development in technique and methodology.

The studies of the prices farmers pay for what they buy is a field of research almost as important in outlook work as the studies of prices farmers receive for what they sell.

A farmer when planning his production program needs to estimate the prices he will have to pay for feed, fertilizer and for machinery and the wages he will have to pay for hired labor. In order to obtain research results useful in this connection it will be necessary to determine the factors that have caused variations in the prices of these items in each area and locality. To date, very little research in this field has been done. It is to be hoped that it will receive increasing attention in the future.

As stated in the beginning, farmers need more than information on the prospective prices if they are to plan their operations most intelligently. Similarly research and extension workers need more than price information in order to make sound suggestions and recommendations concerning changes and adjustments in production.

We might assume that farmers, knowing the outlook for the commodities they are producing or can produce, can decide what adjustments if any, in their operations will be profitable. No doubt, many farmers can and will do this. But when we consider the farming program of an area or locality and endeavor to determine what changes or adjustments the State Colleges or the United States Department of Agriculture may suggest or recommend for the area in the light of the outlook, we must carry our research to the point where it will indicate the changes in income that are likely to result from changes in the production programs of the farms of the area. This phase of research related to outlook work is primarily farm-management research, and since it must be done by areas and localities, it is primarily within the province of the state institutions rather than of a national agency.

Sometimes we are prone to suggest that the production of a commodity be decreased if the outlook is unfavorable, or that it be increased if the outlook is favorable, without considering that nearly always when a farmer curtails one line of production he expands another, and without realizing that even though the outlook for a particular line of production is unfavorable, there may be no more profitable alternative on many farms, or without realizing that even though the outlook for a particular commodity is very favorable, yields may be so unfavorable or production costs so

high that an expansion would mean lower incomes instead of higher incomes on many farms.

In order to visualize the research needed in this connection let us consider the problem that confronts a farmer when he is trying to decide just what production program for his farm in a given year will yield him the greatest income.

To do this, the farmer before beginning his year's operations must, in effect, make a budget of expected receipts and expected expenses for the year, for each of the changes in his production program that seems feasible, and choose that program which shows the highest expected net income.

In order to make a budget of this kind, one must estimate:

(1) The price he will receive for each of his products.

(2) The quantity of each he will have for sale. This involves estimates of yields, and of quantities that will be retained for home use, for feed for livestock, for seed, etc. From (1) and (2) the expected cash receipts can be obtained.

(3) The cash expenses of operation for the year. If feed is to be purchased, the kinds, quantities, and prices must be estimated. If labor is to be hired the amount to be hired and the wages to be paid must be estimated. And so on through the whole list of farm expenses. The difference between the expected receipts and the expected expenses will of course give the expected net income for the year.

If the farm-management staff of the college would work up a series of budgets each year for a representative farm in the area under consideration, or preferably for a number of farms in the area, a comparison of these budgets would show the changes in income of farmers that are likely to result from various changes and adjustments in productions that are practicable in the area. With this information one would be in a position to make sound suggestions and recommendations as to the wisdom of increasing or decreasing the different lines of production in the area.

Here again, as in the analysis of prices, records of the past are necessary. Farm records form the best basis of judging what is to be expected in the way of yields, feed and labor requirements, etc. In other words, farm records and price analysis form the basis for farm budgets.

The technique of farm budget making has been developed in a rather satisfactory way in recent years and the budget method of procedure is being used in farm-management research in a number of states. In making budgets, just as in preparing outlook reports, it is necessary to make advance estimates of expected results and there are many opportunities for error on the part of both farmers and farm-management workers in estimating yields to be exepected, and expenses to be met, to say nothing of the difficulties the outlook worker faces in estimating the prices to be expected for the products. But in most areas and for most types of farming there is now enough information available to make possible the formation of fairly reliable budgets. Recently the manager of a farming corporation in California producing something like a million dollars worth of commodities annually, mostly fruits and vegetables, told me he has been making an annual budget each year since 1922, and that with the exception of 1929, when a severe freeze curtailed his production very seriously, the estimates of income made at the beginning of the year have been within 5 per cent of the actual income.

We have talked much in recent years at the National Outlook Conferences in Washington about localization of the outlook and its application to the different regions of the country and to different sections within a state. We all agree that the national and state outlook reports do not completely "fill the bill," that further work in localization and application is necessary, and that outlook work, to have real and permanent value, must be carried to the point where the results and reports will indicate—somehow or other—what changes and adjustments are likely to prove profitable on the farms in different areas and under different producing conditions. Will not the effectiveness with which outlook work is localized and the results applied in different localities depend primarily upon the development of the two lines of research stressed in this paper: namely, (1) Analysis of local prices,—both prices received by farmers for what they sell and prices paid for what they buy, and (2) Determination of the incomes to be expected on representative farms from various combinations of different lines of production?

PRICE STABILIZATION UNDER THE FARM BOARD

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The Federal Agricultural Marketing Act of 1929 authorizes the Farm Board to stabilize the prices of agricultural products so that "agriculture will be placed on a basis of equality with other industries." To that end, the Board is empowered to establish stabilization corporations backed by an initial fund of $500,000,000. This function of the Farm Board is the culmination of a long campaign by the agricultural group to have the government, directly or indirectly, take a hand in the agricultural price situation. Stabilization has been the most popular form of proposed farm relief, yet the term itself has been one of those happy phrases of wide appeal but of very indefinite meaning. The general feeling among farmers has been that stabilizing prices meant increasing the prices for farm products which are paid to the farmer.

To economists prices are unstable, and hence open to possible stabilization, when they have departed from some equilibrium. The nature of that equilibrium varies from the day to day market equilibrium to the very long time normal price or equilibrium. Between these extremes there are all degrees of equilibria, varying with the time period considered. The purpose of this discussion is to examine the meaning, and theoretical assumptions, of price stabilization as outlined in the Federal Agricultural Marketing Act and exemplified in the policies of the Farm Board. What type of market (competitive or otherwise) for agricultural products does the stabilization program assume? How does the Board relate the policy of conscious stabilization by combined governmental and producer action, to the type of market assumed? What is the Board's idea of the equilibrium or point around which prices are to be stabilized and how is this equilibrium located objectively?

The beginning of the answers to these questions lies in the Farm Board's published statement regarding the meaning of stabilization.

According to the Federal Farm Board's interpretation, the process of stabilization divides itself into two rather distinct classes. The first class is what might be called normal operations, involved in almost everything the Board is doing. Every measure taken to increase the effectiveness of cooperative organizations in any commodity, or improve their financial position, to centralize or correlate their activities so as to make their operations more effective, is in itself a process of stabilization.

The second form of stabilization might be termed extraordinary or emergency operations, whereby, because of a large surplus of any commodity, the operation would consist of buying and taking off the market some considerable part of the tonnage so as to relieve the pressure, and carrying the product until some future date in the hope there would be a more favorable opportunity of disposing of it.[1]

In order to lay the basis for definite answers to the questions raised concerning the Board's policy, the stabilization program will be divided into five relatively distinct parts. By discussing each of the parts in detail, the theoretical implications of the stabilization program will become clear.

I.

Stabilization of Short Time Price Fluctuations

The first meaning of price stabilization seems to be that the Board, through stabilization corporations and relations with cooperatives, shall attempt to iron out the large fluctuations in daily, weekly, and monthly prices of staple agricultural products which occur within the crop year. This interpretation is based upon the theory that over the period of a crop year the prices of staple products tend to be determined by fundamental supply and demand situations. In short-time movements, however, there are possibly three elements which cause prices to fluctuate from the fundamental supply and demand price, with due adjustments for the normal seasonal movement. First, it may be assumed to be true that the market commits errors of judgment concerning the effect of a given supply on a price, or the effect of changes in the demand situation upon the price. These errors lead to erratic temporary fluctuations in the price, but over the period of a crop year reach an average approximately equal to the fundamental supply

[1] Federal Farm Board: Questions and Answers, Circular No. 1, March, 1930, p. 5.

and demand price.[2] Second, excessive marketings by producers at a particular time may reduce prices below what is justified by fundamental conditions viewed over the period of a crop year. Concerning this subject the Board has said:

> After carefully considering all available facts, the Board issued a statement saying that, based on known world supply, the prevailing price of wheat during the latter part of October (1929) was too low. The Board believed that this unsatisfactory price level was chiefly due to the rapid or disorderly movement which put a large part of the year's supply of wheat on the market within a short time.[3]

In the third place, it is possibly true that speculative activity leads to short time fluctuations which are not representative of fundamental market conditions. This assumption would rest upon some such analysis as that made, and conclusions reached, by the Grain Futures Administration concerning the effect of speculative activity on the short-time-movement of wheat prices.[4] One of the means of accomplishing the purposes of the Agricultural Marketing Act is "by minimizing speculation." It is perhaps true that during relatively short periods of time speculators may create an artificial demand or supply situation which will cause the actual price to deviate temporarily, but not permanently, from the fundamental supply and demand price.

This interpretation of the principle of price stabilization further infers that the price which should result from the working of fundamental forces, can be anticipated quite

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[2] "Buyers and sellers of potatoes are frequently mistaken as to the price justified by fundamental economic conditions. If such an error is general in the fall, it may happen, for example, that the price which results is too high. If the price is too high in the early part of the season, potatoes will not be consumed fast enough to dispose of the supply available. Farmers and dealers will then find that not all of the stocks on hand can be sold at existing prices. Since potatoes cannot be carried over from one year to the next, the price, under such conditions as have been mentioned, must be lowered enough to permit the supply to be disposed of before the end of the season. A properly adjusted price would remain the same throughout the season except for a gradual advance to cover cost of storage, and would maintain a fairly uniform consumption throughout the season. But since an abnormally high price early in the season causes small consumption, it must be compensated by an abnormally low price during the remainder of the season, or not all the crop can be sold.

"Similarly, if the price is abnormally low early in the season, the supply will be exhausted too rapidly and those who still have potatoes will find that they can get abnormally high prices for them during the remainder of the season." Working, H.: Factors Affecting the Price of Minnesota Potatoes, Univ. Minn. Agric. Exp. Sta. Tech. Bulletin 10.

[3] Federal Farm Board: January 15, 1930, p. 3.

[4] Duvel, J. W. T. and Hoffman, G. W.: Speculative Transactions in the 1926 May Wheat Future, U. S. Dept. Agric., Dept. Bul. No. 479 and Major Transactions in the 1926 December Wheat Future, U. S. Dept. Agric. Tech. Bul. No. 79.

accurately. The theory and technique of statistical measurement of the relation of the supply and demand factors to prices is now fairly well developed. It is not expected that the price forecasts will be accurate in all cases, due largely to the imperfect nature of supply data. These price analyses usually give estimates with a considerable standard error of estimate. The question then arises, by what methods does the Federal Farm Board arrive at a price around which it attempts to stabilize the short-time movement of actual prices?

It would seem from a knowledge of the methods of statistical price estimation, and of the methods adopted by the Farm Board in the 1929 wheat price situation, that the Board's statisticians attempt to make an estimate of the wheat price based upon available production and carry over data and factors affecting the demand.[5] In such cases, the range of one standard error below the estimated price would be a conservative point about which to stabilize prices. If the actual price moves above this estimated price, none of the farm group should object (unless they expect a bonus!). If the price moves below the estimated level, there is only one chance out of six, assuming that the data used are accurate and that errors of estimate follow the normal curve, that the true supply and demand price is below this estimated price. On these assumptions, the Farm Board can ordinarily conclude, if the price falls below the estimated price, that it is only a temporary situation which will remedy itself, but which can be assisted by stabilizing activities. If the true supply and demand price proves to be below the estimated price two results follow. First, the Federal Farm Board may find it necessary to take a loss out of its revolving fund. Second, the activities of the Federal Farm Board will lose the confidence of farmers to a certain extent.[6]

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[5] See quotation page 597. Note [3].

[6] The Farm Board seems to have lost some of its confidence in the technique of price forecasting after its disastrous experience with the 1929 wheat crop. It has announced that loans on the 1930 wheat crop will be on the basis of 80 or 85 per cent of market value. That, as a general policy, cannot be followed at all times without a "stabilized" price, for wheat prices can easily drop 20 per cent. The misfortunes with the 1929 crop perhaps are more due to the application of the theory outlined above than to the inaccuracy of the theory itself. First, the early carry-over estimates were probably too small. Any error in carry-over data is important in the case of a commodity of inelastic demand. Second, the effect of world wide business depression

The statistical estimation of probable price is possible only where it is tenable to assume a simple concept of supply as a fixed quantity which must be sold within the time period for which the price is averaged. Whenever the supply situation is complicated by the possibility of carrying more or less over into the following time period in response to the outlook for higher or lower prices, statistical estimation of prices becomes less accurate. In the case of wheat reliability of such forecasts is vitiated also by the uncertainty of production in the Southern Hemisphere. Supply as a simple quantity is best represented by potatoes, in which the crop must be sold usually within eight months after harvest. The size of the following early potato crop may even interfere here with the assumption of supply as a quantity.

The most spectacular aspect of this type of stabilization is the activity of stabilization corporations. The Board has taken the attitude that these corporations are for emergencies only.[7] The law does not limit the use of these corporations to dire emergencies. They may be used whenever the Board feels that such assistance is needed to carry out the purposes of the Act.

In addition to stabilizing the short-time fluctuations of prices through stabilization corporations, the cooperative marketing program of the Federal Farm Board must be viewed as part of the same activity. First, we shall discuss the price stabilization aspects of cooperation in the case of those cooperatives in which the farmer retains title to the goods and determines when they shall be sold. These are non-pooling cooperatives, the cooperative acting as a commission agent. If a farmer who is a member of such a cooperative is granted credit at low rates of interest, this will make it possible for him to carry his products for a

was probably not accurately foreseen. In Europe and the Orient wheat is still a luxury and the consumption is greatly influenced by consumers' income. Consumption in America is probably not influenced by business depression. Declines in the price of wheat have very little effect on bread prices. The speculative collapse in November, 1929, had an effect on the wheat market, but whether this can affect the average price for the season is not clear. Third, the indefinite extension of the generally expressed increment of the trend of demand of 70,000,000 bushels per year is of doubtful validity. The tendency of such trends, particularly where in part they depend on changes in taste, is to slope off instead of following a straight line. Fourth, the outlook for the 1930 crop has continued to forecast good yields.

[7] cf. Mr. Alexander Legge's Address before the Chamber of Commerce of the United States and Mr. C. C. Teague's radio address of May 8, 1930.

considerable length of time.[8] If price fluctuations are caused by relatively excessive marketings by producers who are forced to sell due to their financial condition, Farm Board loans should have a stabilizing effect. But as to price fluctuations from other causes, the conclusion is not so simple. Loans on easy terms will enable the individual farmer to attempt to obtain a high price. Whether this can be viewed as stabilizing the market price is open to question. If, when the price went up, farmers sold in large numbers, this would tend to check the upward movement. If, on the other hand, farmers withheld their wheat when the price was falling, this would check the decline. The net result of these two operations would be to restrict extreme price fluctuations. As a matter of fact it is fully possible when the price starts to rise that farmers are encouraged that the price will rise further and as a result hold their product. On the other hand, if the price declines, the farmers may lose confidence in the future and thus dump large quantities on the market and greatly depress the price. The only way in which loans on products which are being carried by the individual farmer will stabilize the market price is for the farmers in large numbers to adopt the guidance of the Federal Farm Board as to the probable price of the product.

Thus, Mr. Alexander Legge, in his tour through the middle west wheat belt in July, 1930, advised farmers that wheat prices would be twenty-five per cent higher, if the farmers stayed out of the market. The Farm Board's Press release of August 7, 1929, had given similar advice for the 1929 crop. In case the price is favorable in relation to the Farm Board estimate, the farmers would then sell. In case the price is below the Farm Board estimate, the farmers would hold, expecting the price to rise. This aspect of stabilization again turns on the possibility of making accurate price forecasts.

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[8] "To prevent losses among grain growers, the Board on October 26 offered to increase supplemental loans on wheat to cooperative associations so the grower member of those associations might withhold their grain from the depressed market with the hope of obtaining a better price later. This action was in harmony with that taken on October 21 to help the cotton growers through their cooperatives. Believing that the remedy was to be found in more orderly marketing, the Board adopted this loan policy in order to assist wheat farmers in holding back their crops and at the same time supply them with money to be used in paying their obligations."

The cooperative marketing program of the Farm Board can be viewed also as affecting the stability of agricultural prices through the action of region-wide and nation-wide pools.[9] If these pools had the authority to sell the wheat in more or less regular quantities each month, taking whatever price the market would pay, there would be interesting results on the price situation. The fact that an important contributor to the total market supply was not selling in response to a particular price situation but that this contributor was selling a regular amount each month would tend, to a certain extent, to prevent the extreme fluctuation which now sometimes occurs.[10] Whereas, under the present situation, a price increase may encourage still further holding of the product or a price decline leads to dumping of large quantities on the market, in the situation assumed here, a very large quantity is regularly fed to the market, irrespective of the price. This should lead to a certain amount of price stability.

The second way in which a large pool can stabilize prices is by succeeding in the adjustment of its sales inversely to price fluctuation.[11] In his analysis of Canadian Wheat Pool, Mr. J. F. Booth points out that the Canadian Wheat Pool has adopted the program of selling wheat when its management feels it is the most advantageous time. For the 1925-1926 season, the pool estimated that it succeeded in obtaining for its members a price higher than the average price for the season.[12] If a nation-wide wheat pool is given the right to determine when it will sell wheat, insofar as it is successful in determining the advisability of sale at

[9] "Some of you will say that we have not mentioned stabilization corporations. It seems to me that it may well happen that the cooperatives now in existence, or improving organizations growing out of existing cooperative organizations, may prove to be all that is needed to carry out the idea of stabilization corporations. There may prove to be extreme cases which call for measures that cannot be carried out by the cooperatives, but it is hoped that correction of the fundamental causes of agricultural emergencies will enable the Board to consistently carry forward a program based on the development of large, well-financed and efficiently-managed cooperative organizations." Address of Mr. Alexander Legge before American Institute of Cooperation, July, 1929.

[10] A regular amount each month does not mean one-twelfth each month. The monthly sales would be adjusted to the average monthly purchases, in per cents of the annual total to meet the fact that buyers' demand is not uniform in all months of the year.

[11] The distinction between pools which sell in pre-arranged quantities per week or month and those which attempt to out-guess the market is a matter of degree, when one considers any particular cooperative. Probably few, if any, cooperatives disregard the price situation entirely in selling, or, on the other hand, are out of the market entirely at any particular time.

[12] Booth, J. F. Cooperative Marketing of Grain in Western Canada. U. S. Dept. Agri., Tech. Bul. No. 63, pp. 51-58.

a particular time, the short time movement of wheat prices would tend to be stabilized. Under this program when the price of wheat is advantageous the pool would sell, having the effect of lowering the price. On the other hand, when the price of wheat was viewed as below the average price for the season, the pool would stay out of the market. Successfully following such a plan as this again depends upon the forming of an estimate of the annual average price of products in much the same way as the method surmised as being adopted by the Federal Farm Board in determining its loan price for the 1929 wheat crop.

II.

Clearing House Activities

The Federal Agricultural Marketing Act also authorizes the Farm Board to assist in the forming of clearing house organizations in the marketing of certain agricultural commodities.[13] The daily and weekly prices for most perishable farm products at any and all market points oscillate considerably. The prices of most livestock for slaughter come in this category, because the cost of holding the stock at the market point for any length of time is prohibitive in the light of the risks assumed. These price fluctuations are largely the result of fluctuations in receipts. The latter fluctuations are in part due to attempts by shippers to adjust their shipments to the price situation. High prices stimulate shipments, and *vice versa*. In part the fluctuations in shipments are due to the influence of weather.

The theory of the clearing house is that an association of shippers which has the power to determine time and quantity of shipments, can, in a large measure, eliminate extreme price fluctuations. Prices would be stabilized around the general seasonal movement based upon the general increase or decrease of receipts. Interference with the normal seasonal movement of prices is not usually a clearing house function.

[13] Dr. E. F. Dummeier, in his article in the March, 1929 issue of the Journal of Farm Economics, questions the soundness of the clearing house idea, particularly as it has worked out in the experience of the last few years. It is not the purpose of this discussion to point out whether or not a particular policy will succeed. It is rather the purpose to interpret the meaning of price stabilization as that term is used by the Federal Agricultural Marketing Act and as interpreted in the policies of the Farm Board.

In the case of some of the more perishable products considerable difference exists between prices obtained in different markets at the same time (aside from difference in transportation costs from source of supply). These differences have no doubt been reduced by the diversion in transit and other "trying the market" privileges extended to shippers. The purpose of a clearing house would be to so regulate shipments to all markets, that combined with regulation of time and of total quantities shipped, the general price movements at all markets would uniformly change with the normal seasonal movement of prices.

Besides the necessity of adequate powers and efficient management, the clearing house is based upon four assumptions, not all of which apply in every case: First, the clearing house must control the dominant part of the product in question which supplies the market or markets for which clearing house activities are being carried on. Even the most carefully worked out clearing policy can be disrupted by "interlopers." The lack of market-wide or industry-wide control has probably been a major factor in the failure of many clearing house programs.

Second, successful clearing activity must be based on a knowledge of the general level of prices of the product which will prevail for the season. Heavy shipments must not be withheld from the market if the average price for the season is to be low or else consumption will be unduly small and products will be stored up which must be dumped later, when the error is discovered. Too heavy shipments early in a light production year will force down prices unduly. The accurate forecasting of the general price situation is particularly important for products such as potatoes and perhaps livestock still on the farm where they may be held at moderate costs. Again the necessity of accurate predictions of the general price situation is obvious.

Third, the clearing house management must know the normal seasonal movement of the price of the product being cleared. It must show skill in adapting its program to the modifying effect on the seasonal movement of weather and other unusual factors. Unless it is found advisable to force some change in the seasonal movement, to withhold ship-

ments from the market at the point of usual seasonal increase would be a grave error. Similarly, to stimulate shipments at the time of seasonal decrease would be equally erroneous. The seasonal movement of prices and shipments of many products is extremely complex, particularly where the weather is an important factor. In practice, the comprehension of the seasonal movement in a particular year probably would rest upon good judgment based on all of the information available.

Fourth, the theory of the clearing house assumes an accurate knowledge of market capacities, the quantities which various markets will take at certain prices. This assumption becomes particularly important if the clearing association is to extend its activities to the point of keeping part of the produce off the market entirely if it cannot be sold at a price covering harvesting, packing (where it is done at a shipping point), and transporting. This problem will be discussed under the fifth interpretation of price stabilization. Even in the more strictly clearing activities the management must study the relative capacities of different markets. There is no basis for the assumption that the buyers' demand curve in different markets is similar for all products. The distribution of income, the customs and habits of the people, the uses made of the product and all of those factors contributing to differences in the demand of individuals lead to differences in the demand of different urban areas. Some progress has been made in the statistical study of market capacities for some agricultural products.[14] The character of the markets concerned and the data available are conducive to statistical analysis. The Board's clearing house policy is well illustrated by its support of the California Vineyardists' Association.

III.

Policy with Regard to Annual Surpluses

The problem of year to year surpluses in which the Farm Board might assist in carrying over part of the crop has

[14] cf.: Rauchenstein, E.: Economic Aspects of the Cantaloupe Industry, Calif. Exp. Sta. Bul. 419 and Hedden, W. P.: Studies of Market Supplies, Prices and Sales as a Basis for Control of Distribution of Perishables, Jour. Farm Econ. April, 1926.

to do with the third interpretation of price stabilization. Mr. Alexander Legge has specifically said that the Board cannot assist when farmers willfully overproduce. The law forbids the Board to lend money where there is commonly produced a surplus in excess of the annual marketing requirements.[15] Hence the Board policy must be largely one of ameliorating the effect of surpluses due to unusual yields, by spreading the effect of such surpluses over more than one year. Even then it is possible but not probable that high yields may occur two years in succession.

The Farm Board has not shown any great tendency to encourage the carrying over of part of one crop into the following year. So far there has arisen no case in which overproduction was due to unusual yields, a situation which would probably remedy itself the following year. The Board refused to lend money on wheat after April 30, 1930, for to do so would encourage holding more of the 1929 crop to compete with the probably large 1930 crop.[16]

Just what the Board's program will be when faced by overproduction of a non-perishable, under a situation in which the outlook for the following year is for a considerably smaller crop, is uncertain. The Board will probably encourage the carrying over of a considerable part of the crop. It is certain that the Board does not propose to dump the surplus abroad at a loss. There is no provision for such action in the Act.

IV.

Control of Productive Capacity

The Farm Board seems to base much of its future on the success of its program to bring productive capacity of each and all agricultural industries in line with demand. As the starting point, the Board must decide what price is "the fair price," "the normal price," or the price toward which sta-

[15] Agricultural Marketing Act: Section 5, (d).

[16] The Grain Stabilization Corporation did, as a temporary expedient to buoy the market, announce that its holdings of 1929 wheat will not be sold to compete with the 1930 crop unless the price rises to the loan level. (Release of June 26, 1929.) The Farm Board had expected when these purchases were made that the price situation would quickly be remedied and the corporation could unload. Since such was not the case, the stabilization activities discussed under Section I, take on some of the characteristics of the activities discussed in the present section, with reference to the 1929 wheat crop.

bilization is to bring actual prices. The Board has not announced what it understands to be the stabilization price, or how this price is located, objectively. But it has repeatedly said that it did not wish to controvert fundamental economic forces. The best interpretation of that statement would seem to be that it did not wish to prevent prices from reaching their long-time competitive equilibrium. If that be the case, the stabilized price toward which the adjustment of productive capacity is aimed corresponds to the normal price of economic theory. The objective location of that price must be largely a matter of a long-time trend of actual prices, with possibly some adjustment based on the recent demand changes and changes in the competitive situation, such as the development of new productive areas or changes in productive methods. Once the equilibrium price has been located, statisticians could determine the production which would sell at this price. To determine the proper productive capacity to keep prices near the stabilized point, would then be the task of determining yield trends.

Ordinarily the productive capacity at any particular time is not such as to yield the normal price to producers but a price above or below the normal. This situation is the result of (a) unusual yields, (b) errors of judgment by producers collectively concerning the proper productive capacity, or (c) changes of demand. Stabilization under the conditions of (a) has been discussed in the preceding section. It is in connection with the second and third headings that the Farm Board has placed considerable reliance for its ultimate success or failure. This is a real problem in price stabilization, for prices out of line with the normal price are unstable. The function of the Farm Board is to assist and speed up the return to the competitive equilibrium. The problem is that of adjusting productive capacity between products and of all products together to the demand situation.

In this program the Farm Board is standing squarely on the work which the Bureau of Agricultural Economics has been doing for several years through its Outlook Con-

ferences and extension activities.[17] Only an extreme optimist would conclude that the work of the Bureau, fundamental and important as it has been, has done much to return agricultural prices to their normal equilibria. The advice, or at least as it probably was interpreted by the farmers, did not sufficiently emphasize that it was the marginal producer who should respond, either those on the margin of substitution or of going out of cultivation.[18] The farmers lacked confidence in the Bureau's advice in general. If they had confidence that others would follow the Bureau's advice, there was a strong individualistic motive to go contrary to the advice and profit thereby. Adequate response could come only through group action which was wanting. The Bureau, as well as warning against unusual increase or decreases in productive capacity, has tried to anticipate changes in demand which warrant changes in productive capacity.

Whether the Board can overcome largely the difficulties which faced the Bureau in this program is an open question. The circumstances leading to and surrounding the Board's appointment may arouse sufficient confidence in the Board's advice that needed changes in productive capacity will take place. A necessary corollary is that some way be found to divert this confidence in the proper direction. A sufficient group spirit (or appeal to profits) must be developed that marginal producers will change and that no other producers will change in the wrong direction. At best, the success of this program is uncertain.

The Board is relying on a new agency to assist in the control of productive capacity, the cooperatives. Authorities in the field of cooperative marketing have long realized that these organizations, particularly where commodity-wide, should assume as one of their major functions, the control of production capacity. Thus far, few cooperatives have made progress in this regard. But the Farm Board hopes that now commodity-wide organizations will assist in spreading, and carrying into effect control of productive capacity.[19]

[17] See Outlook Reports: Annually, 1924–30.

[18] This problem is discussed excellently in the National City Bank Letter for April, 1930.

[19] Pointed out by Mr. Alexander Legge, during his tour of Nebraska in July, 1930.

V.

Diversion of Surplus to Non-Competitive Channels

The Farm Board would sound its own death knell if it should undertake a program of destroying part of the production of important staple products. It would make little difference to labor and other groups if the plan were only to fail to harvest. As a matter of fact many acres of crops are not harvested under our regular price system, during low price years. Yet the Farm Board is supporting a stabilization program which involves an agreement not to harvest part of the crop if the price situation warrants such action. This program is part of the plan for the California grape industry.

The grape and raisin industry faces a chronic over-production situation. Due to irrigation, the yields are fairly constant, barring frost. Mr. C. C. Teague estimates the average overproduction to be 300,000 tons of grapes or about one-seventh of the average crop.[20] This overproduction situation could be solved by reduced acreage. Disastrously low prices since 1922 have had no substantial effect on acreage.[21] The heavy sunk investment in vines deters reduction of productive capacity. Rather than force acreage curtailment the Board is supporting the plan of diverting the surplus into non-competitive channels. The non-competitive channel emphasized is by-products. To develop by-products industries for those agricultural products which have occasional great surpluses has not appeared practical. But here the surplus is rather consistently produced. At best the possibility of the use of 300,000 tons of grapes as by-products is doubtful. Added to this is the necessity of time to develop processes, machinery, markets for grape by-products. Therefore, the stabilization plan, expressing the hope that eventually by-products plants can use the surplus, provides what is expected to be the temporary expedient of not harvesting that surplus which would force the price below a point which will encourage neither increase nor decrease of acreage. The Grape Control Board, the in-

[20] Address by Mr. C. C. Teague: Fresno, California, Mar. 12, 1930. This address and the contract presented to growers outline the grape stabilization plan.
[21] Agricultural Outlook for California, 1929.

dustry-wide organization which is to include eighty-five per cent of the production, shall determine when such action is necessary. Those farmers who are instructed to leave their grapes on the vines will be reimbursed for their tonnage at a set rate out of funds collected by a deduction from the remittance to growers for grapes or raisins delivered to the Grape Control Board's agencies.

The price below which such stabilizing activities begin is not such as to encourage increased acreage. It is probably sufficiently high so that present acreage would not be reduced. The Farm Board views the plan as a temporary expedient awaiting the devolopment of by-products industries. There is probably also a hope of expanding demand for grapes and raisins.

VI.

Summary

Each phase of the Farm Board's stabilization program is based on the estimation of the probable price which results from a given supply and demand situation. Estimation is necessary whether clearing house activities or the adjustment of productive capacity is being emphasized. In parts I, II, and IV, of the stabilization program the estimated price is supposed to be an objective price corresponding to the equilibrium price of economic theory. Then the cooperatives, the stabilization corporations, the clearing houses, the leadership of the Farm Board, as related to organizations and individual producers, and the Federal Treasury, are to bring actual prices quickly to the equilibrium points. A program of so distributing unusual annual surpluses that the effect on any one year will be limited brings a concept of the stable price which does not correspond with the usually accepted idea of the equilibrium price. This program includes too much of conscious group planning to be called competitive in the usual sense. Much the same conclusion must be reached concerning the plan for diverting surpluses into by-products.

The general concept of a competitive market held by economists has been one in which there is no conscious coaction among either buyers or sellers. Each person in the

market is seeking his own monetary advantage. It is realized that errors of judgment are made on both sides of the market. Time is required for competitive forces to bring prices to equilibrium. In fact the movement toward equilibrium points is best viewed as a tendency, but actual prices probably never rest at the equilibrium. Parts I, II, IV of the Farm Board's program do not deny the necessity of an equilibrium corresponding to the competitive equilibrium. Thus no element of monopoly which would stimulate production is anticipated. But the program does call for assisting and speeding up the arrival of actual prices at a point approximating the equilibrium by conscious group action. Once equilibrium has been reached, departure therefrom will be resisted. Therefore the prices resulting are expected to be similar to those reached by competition on the average. The difference lies in the forces which bring prices to this point. Individual self-interest and bidding as the motive forces are to be replaced by group action.

In Parts III and V of the stabilization program a still further departure from a competitive market is noticeable. To plan by group action the equalizing of prices over a period of years or to divert excess production into non-competitive channels, is far beyond the concept of competition as bidding, even with a high degree of intelligence between unorganized buyers and sellers. Thus in all its aspects the stabilization program is looking forward to a market situation in which prices are set by means similar to the devices of trade associations, gentlemen's agreements, and other agencies, which are influencing the prices of many manufactured products today.

NOTES

THE AGRICULTURAL ADJUSTMENT BILL

In the closing days of the last session of Congress a bill was introduced which is of much interest to agricultural economists. It bears the title, "To Aid Farmers in Making Regional Readjustments in Agricultural Production to Assist in Preventing Undesirable Surpluses" (H. R. 13275). It was introduced by Congressman Victor Christgau of Minnesota, who is an agricultural economist with two years of graduate training at the University of Minnesota.

The bill provides for an extension of the present program of the United States Department of Agriculture and the state land grant institutions in collecting and disseminating outlook information, analyzing data of current economic changes, and determining needed readjustments. In addition the bill provides for (1) a regional organization of research and (2) carrying on economic experiments and demonstrations under actual farm conditions. Appropriations to the United States Department of Agriculture and to the states amounting to about $6,000,000 per year by 1934 are asked for.

Further information regarding the bill is best presented in Congressman Christgau's own statement concerning it, as follows:

"During the last 10 years the United States Department of Agriculture has become a vast organization capable of gathering information of value to the farmers from every possible source. By scientific analysis of data so gathered, it has been possible to forecast the agricultural outlook to a point where it has been able to obtain a substantial accuracy in the forecasting of economic conditions in the national marketing of agricultural products.

Individual farmers have been restricted in the use that they could make of this information, however, by reason of the fact that local conditions may vary to a considerable extent from national conditions. Not very many of the States have had adequate funds to study economic conditions and the price outlook with respect to their local markets.

The bill that I have introduced will provide funds to enable each State to interpret in the terms of each of its own economic regions the economic outlook of the various products in such detail that individual farmers would be able to utilize the information to the best advantage. The bill provides for a fuller development of farm-management projects in each region of the country. The provision for regional research corporations makes it possible not only to work out in theory the systems of farming which would pay best in each section, but also by actually trying out these systems on real farms under actual operating conditions would make it possible actually to determine and demonstrate the kind of farming that would probably offer the greatest profits.

In its efforts to aid farmers in each region of the country to adjust their production to the economic outlook for each of their products the Farm Board has found itself much hampered by the very limited amount of farm-management facts now available for a basis for making recommendations. There are several hundred different types of farming areas in the country, with a number of different characteristic types in each area. Each area must be studied as a unit by itself, and the best and most profitable system of farming determined separately for each type in each area. So far it has been possible to do this for only a very small per cent of the regions of the country, owing to the limited funds and personnel available for this work. This new proposal provides additional funds for this type of investigation. If adopted, within a relatively short time it will provide the Farm Board and other agencies that are coping with the agricultural problem much fuller information upon which to base their production advice to farmers. It will also provide farmers in each area with the most accurate and scientifically determined information on which to plan their farm operations.

The measure provides a new economic research set-up, cooperative between the United States Department of Agriculture and the State agricultural colleges and experiment stations, with sufficient continuous financial support as to allow coordinated regional production, economic, and farm management investigations to be carried on upon the basis of the knowledge so obtained. Programs of farm readjustment and farm reorganization can be formulated which will permit the farmers to take advantage of changed economic conditions and changes in technique. In some cases it will make

possible the systematic substitution of other enterprises for surplus-producing enterprises, especially where certain farm enterprises are now carried on in high-cost production regions.

As yet the public has given little attention to this feature of the agricultural problem of the United States. This condition is due partly to the lack of available funds to research institutions and the historical emphasis on production rather than on economics and farm management. Of the 2,500 agricultural research workers in the State agricultural experiment stations, it is doubtful if over 2 per cent are engaged in research work dealing with regional competition and advantage and the economics of agricultural adjustment and farm management. Of the total appropriations for the United States Department of Agriculture only approximately $200,000 are used for such purposes. Scarcely any attention is given to the matter by the 5,000 county agricultural extension agents scattered throughout the United States. This, undoubtedly, is due to the fact that they have no organized, systematic material of this nature upon which to base extension work and extension programs.

The following steps should be taken in putting into effect this suggested economic research program:

First. Outline accurately the type of farming regions in the United States. The major regions, such as the Cotton Belt, Spring Wheat Belt, and Corn-Hog Belt, should be split up into the natural geographic subdivisions. It has been estimated that there are approximately 1,500 of such type of farming subdivisions within the United States.

Second. Ascertain the comparative costs and advantages, economic competition, and so forth, of the various lines of production in the various regions. This type of research should deal with the economics of production, the principles of business organization of farms, the lowest cost combination of the proper units of land, together with the modern farm power and labor-saving equipment, and various operations and production practices. Upon the basis of this research new farm organization setups and new farm combinations of cooperative machinery and enterprises should be worked out in relation to the agriculture of the whole of the United States. It will be found that if systematic readjustments are made upon this basis depressing surpluses can in many cases be controlled and the reorganization of farms on the better grades of land can be made to return incomes which will give farm families satisfactory standards of living. In regions in which such studies show the present state of agriculture to be submarginal and the possibilities of readjustment nil, the facts can be presented to the people of such areas on a scientific basis rather than on mere opinion and definite plans for gradual abandonment of such areas can be developed.

Third. The regional research councils which are set up by the proposed measure should coordinate research work within a region in terms of regional rather than State lines. Experiments and demonstrations under actual farm conditions should be carried on to determine the feasibility of such reorganized systems of farming, making possible the working out of individual farm readjustments.

I do not believe that this proposal conflicts with any of the duties assigned to the Federal Farm Board. The Federal marketing act provides, under section 5, that—

The board is authorized and directed to investigate conditions if production of agricultural commodities and advise as to the prevention of such overproduction, and to make investigations and reports and publish the same, including investigations and reports upon the following: Land utilization for agricultural purposes; reduction of acreage of unprofitable marginal lands in cultivation—

And so forth.

Since it is not to be expected that the Farm Board would set up an elaborate research organization of its own, it appears that the best procedure to follow would be to cooperate with the established research agencies of the United States Department of Agriculture and the State colleges and experiment stations in working out this feature of the farm problem."

Harvard University *J. D. Black*

CHEESE CONTENT IN MILK

The relationship between solids and the fat content in milk and the combining of these elements into the product cheese has been a subject of many laboratory experiments and innumerable controversies among cheese-producing dairymen. Professor Van Slyke of the New York (Geneva) Experiment Station was probably one of the first dairy scientists in this country to undertake extensive investigations to determine cheese yields in milk of varying butterfat content. The results of this study and subsequent experiments for verification have formed the basis for specific instructions as to how to divide the net receipts of cheese factories among patrons.

A Wisconsin Experiment Station Bulletin, No. 276, reviews several methods

of distributing these receipts and arrives at the conclusion that for 95 per cent of the patrons' reports examined, the "straight fat" method is sufficiently accurate for all practical purposes (although being correct only to within 2 cents to the dollar). There are more reasons than one for questioning the validity of the main conclusion of this study; but granting its validity, one must still ask how the other 5 per cent of the patrons are to be compensated for their share in the factory product; also whether it is feasible to employ two methods of distributing proceeds among patrons within the same factory for any given month.

A recent survey of American cheese factories in Wisconsin is of interest in that it ascertains the actual practices and results of a representative group of factories in the three main cheese-producing districts of the state. It was very evident that many of the cheesemakers were not entirely satis-

TABLE 1.—AVERAGE YIELDS OF CHEESE PER POUND BUTTERFAT AND PER HUNDRED-WEIGHT OF MILK CALCULATED FROM 3972 MONTHLY REPORTS OF WISCONSIN CHEESE FACTORIES FOR THE YEARS, 1926, 1927.[2]

Butterfat test	Average yield pounds of cheese per pound of butterfat	Average yield pounds of cheese per hundredweight of milk
3.0	2.826	8.478
3.1	2.790	8.649
3.2	2.755	8.816
3.3	2.722	8.983
3.4	2.698	9.173
3.5	2.674	9.369
3.6	2.657	9.565
3.7	2.643	9.779
3.8	2.632	10.002
3.9	2.624	10.234
4.0	2.617	10.468
4.1	2.612	10.701
4.2	2.606	10.945
4.3	2.60	11.180
4.4	2.594	11.414
4.5	2.588	11.646
4.6	2.582	11.877

fied with the "straight fat" method of settlement, because they have observed from actual experience that the ratio between yield and fat in the milk changes as the per cent of fat increases. While the majority of the associations adhere to the "straight fat" method, a considerable number of them are experimenting with other methods of settlement in an attempt to find the most equitable and fair means of dividing their receipts. The commonest of the five prevailing modified methods found in use was the "average test + or – a differential."[1]

To give any satisfactory answer to the problem of dividing cheese factory receipts, it was first necessary to determine what actual yields were being obtained in various factories and to what extent these yields varied from the standard yield (at 37% moisture content) as tabulated in the New York study. Monthly reports for approximately 125 factories were collected for

[1] A. Average test + or — a differential
B. Fat + 2
C. Fat + .6
D. Ten for one
E. Two and one-half for one

[2] See Wisconsin Research Bulletin No. 100, p. 23.

a period of 3 years (1925, 1926, 1927). After each report was checked for accuracy, the results were tabulated in a double-frequency table and the coefficient of correlation was determined for each month of the year. A slight degree of inverse correlation appeared, the extreme values of R ranging from —.41 for the month of July to —.54 for the month of September. The mean yields indicated for each class interval in Table 1 are the products of a smoothed curve which was fitted to the series by visual inspection. As the test varied from 3.0 per cent to 4.6 per cent, the yield expressed in terms of pounds of cheese per pound of butter fat decreased from 2.826 pounds to 2.582 pounds, whereas expressed in terms of pounds of cheese per hundredweight of milk, the yield increased from 8.478 pounds to 11.877. The latter represents an average of about 2/10 of a pound for each additional point in the test.

There are, however, many other factors than butterfat that go to explain

TABLE 2.—RESULTS WHEN USING FIVE METHODS OF DIVIDING PROCEEDS AMONG PATRONS IN CHEESE FACTORIES

I Patrons	II Actual per-cent fat in the milk	III Actual aver-age value of cheese based on average yield*	IV The fat+1 settlement per cwt. milk	V Straight fat settle-ment per cwt. milk	VI Fat+2 set-tlement per cwt. milk	VII Fat +.6 settlement per cwt. milk	VIII Differentials of 3 cents per one-tenth pound fat per cwt. milk
A	3.0	$1.57	$1.58	$1.50	$1.62	$1.55	$1.65
B	3.5	1.77	1.78	1.75	1.79	1.77	1.80
C	4.0	1.97	1.97	2.00	1.95	1.98	1.95
D	4.5	2.19	2.17	2.25	2.14	2.20	2.10
Totals	15 lbs.	7.50	7.50	7.50	7.50	7.50	7.50
Range between lowest and highest returns		.62	.59	.75	.52	.65	.45

* See Table 1.

variations in the quantity of cheese that may be made from a given quantity of milk, and which should be considered in problems dealing with yield. Among these factors are:

1. The quality of the raw material, milk.
2. The technique employed by the cheesemaker in preventing waste in manufacturing processes.
3. The accuracy of weights and tests of raw materials and the finished product.
4. The moisture that is incorporated in the finished product.

These and possibly several other causes are ever present, producing differences between factories that cannot be explained on the basis of butterfat test alone. The significance of these disturbing factors and their relative importance has not yet been determined. A combination of experimental and statistical method may be needed to make these determinations.

Table 2 shows the variations in results from calculations of proceeds by the various methods. It is assumed in this table of hypothetical figures that the price of butterfat is 50 cents per pound. Column III shows how $7.50 would be divided among patrons A, B, C, and D, each delivering 100 pounds

of milk, testing 3.0 per cent, 3.5 per cent, 4.0 per cent and 4.5 per cent respectively, if divided according to the yields found in the 125 factories studied, as reported in Table 1. This evidence of the experience in yields of Wisconsin cheese factories indicates that if one point is added (Fat + 1.0) to each individual patron's butterfat test, the distribution of proceeds will correspond almost exactly with the actual value of cheese made from each patron's milk. (See column IV, Table 2.) It is to be noted also that the "Fat + .6" method (column VII) corresponds closely with the actual average value of cheese. The "Fat + 1.0" settlement may be slightly more accurate in payments to patrons with fat tests ranging from 3.0 to 4.0 per cent, while the "Fat + .6" method appears to be preferable for factories with tests ranging from 3.5 to 4.5 per cent fat test. These two modified methods are certainly to be preferred to any of the others and they appear to be superior to the "straight fat" method in that none of the patrons are discriminated against nor favored because their test happens to be much different than the average factory test.

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ON THE RELATION OF YIELDS TO INCOMES

A recent farm business survey bulletin contains a generalization to the effect that the farms in the survey with the highest yields have the largest net incomes. This might have been, of course, almost any farm business survey bulletin that has ever been written. This circumstance leads one to raise some questions as to the nature of such a statement considered as an economic law or principle and as to its significance and usefulness.

First, may we assure ourselves that in all cases the generalization is a true one. If the method of analysis employed consisted merely in setting group averages of incomes in parallel against farms arrayed according to yields, so large an amount of irregularity in the relationship may have been covered up in the averages as to make the generalization invalid.

Assuming, however, that the irregularity so concealed is not this great, that true correlation has been demonstrated, as no doubt it could be in a great majority of surveys, what is the meaning of it? To be sure, one kind of uniformity has been found among these farms—on the average, with a degree of regularity measured by a coefficient of correlation, the farms having the higher yields also have the higher net incomes. Such a generalization, combined with others of a similar nature, serves to provide a description of the area, and of all areas within a universe of the same general order. Discovering such uniformities is one of the major objects of all science. They help us to get a better picture of our environment. They reveal things about our environment that we fail to see for ourselves. They are also supposed to have a sort of forecasting value—to help us to know in advance what some unanalyzed area is apt to be like.

But the questions which come to a farm manager, and farm management teachers and advisers, usually come in another form—in such a form as

this: Can I on this particular farm increase my income by increasing my yield? How much, and at what rate, can I increase my income by increasing my yield? There are different ways of increasing yields—which one shall I choose? Obviously such a generalization as above stated is of little value in answering such questions as these.

To begin with, the foregoing statement does not really tell us that beyond reasonable question increasing the yields in the area as a whole will increase average incomes. The positive correlation between yield and income by no means proves that the higher yields that increased the income were mostly due to efforts to increase yields through using more fertilizer, seed, spray, labor, etc. The positive correlation may have arisen in any one of the following ways:

1. More rain may have fallen in some parts of the area than others—giving higher yields at very little increase in expense of production.

2. The particular amount of rainfall in the year may have especially suited or injured the crops in different parts of the area.

3. Frosts, diseases, etc., may have produced similar differences in different parts of the area.

4. Some of the crops may have been planted and tended more carefully than others at very little additional expense, the work being largely done by proprietors and family labor which, according to the usual survey procedure, tends to be counted as working full time regardless of how hard it works.

5. Some of the farm operators may have been more skillful than the others in crop management, or more fortunate in guessing the peculiarities of the season, which differences are associated with little or no differences in expenses or costs as usually reckoned.

6. Some of the land may have been more fertile than the rest, giving higher yields at very little additional expense. If rent or interest is included as an expense, it may offset this advantage in some fashion. But rents are usually figured as average rates for farms as a whole, not for land alone not for land in crops separately, and not for each field separately. The charges for these reasons will usually be too low for the high-yielding crops.

7. It must also be remembered that the high-yielding crops are the ones which take the most plant-food out of the soil, and should have higher rents, but seldom do.

8. Again rents are seldom adjusted to the particular condition of the soil when used for growing any particular crop. Some crops have the benefit of fertilizer applied the year before, or of a crop of legumes.

9. More actual expense, as reckoned by survey methods, may actually have been incurred through applying more fertilizer or spray, or using a larger labor force in caring for the crops, or more machinery and power.

It is obvious that only the 9th explanation is a true cause-to-effect relationship of the sort needed for the questions above raised. All the others are associations of another nature. Only the 9th, and in some measure the 6th, involve an expense (other than that connected with harvesting a larger crop) that increases with the yield. All the others give higher yields at very little more expense. In the case of proprietor and family labor working harder,

no doubt a cause-to-effect relationship exists, but no measure of it is ordinarily included. It is not strange, therefore, that correlation coefficients between yields and net incomes tend to be definitely positive.

What would they be like, however, if the true cause-to-effect relationships could be isolated? Probably positive in most cases, and in many cases, of sizable proportions. But they might also frequently reveal points of diminishing return (See Dr. Hopkins' article in the July Journal of Farm Economics).

Can such relationships be isolated in survey data by multiple correlation methods and the like? The answer must be—only partly.

It will be suggested that what is needed to make such results useful in answering the above questions is the computation of regression coefficients, so that the manager may know at what rate income increases with yields. We will then have our results in quantitative in place of qualitative form. But obviously the regression coefficients would represent all the nine forms of association above listed—not the last one alone. It would appear that they would show income increasing considerably faster with yields than would result from deliberate effort to increase them by using more fertilizer, labor, etc.

The kind of generalizations that are needed to answer the questions stated are rather of the following order: Increasing by so much the quantity of fertilizer (of a given type) used per acre on this crop, grown on this type of soil, in this state of tilth and fertility, will, in a season of normal weather, increase the yield by so much per acre, at this point on the curve of diminishing returns; the additional fertilizer expense will be so much; the additional other expenses will be so much; the additional gross income from the crop will be so much; and the additional net income so much. There will need to be similar statements as to effect of different degrees of labor intensity in caring for the crop, different cultural practices, different degrees of substitution of machinery and power for labor, etc. The combination of these statements will give an "enterprise" analysis. The final answer is not obtained until this enterprise is fitted into the farm business as a whole, and the additional expenses and receipts are combined with those of other enterprises. The additional yield may be of forage crops for the livestock. The additional fertilizer or labor may be taken from another crop.

When the results of analysis have been reduced to the foregoing form, then economic principle has been reduced to a working basis; then economics has become truly quantitative.

Even if our interest is in the broad social questions of the effect of increasing intensity in agriculture, and whether or not the point of diminishing returns has been reached, we have no answer in the statement that higher yields are associated with higher incomes as derived from farm business surveys, since we do not know from this statement whether more intensity would increase incomes, or at what point it would cease to do so, or did cease to do so.

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THE RELATION OF PRICE TO APPLE PRODUCTION

The relation between price and production and the response of growers to price has already been discussed in the Journal.[1] The response of producers through increased acreage is applicable to most crops. The relation between price and increased care is more difficult to measure. Yields per acre of potatoes tend to be lower following a year of low prices, and higher following a year of high potato prices, due to the greater attention given to the handling of the seed, soil, spraying and general care of the crop. This relationship is interesting in the case of apples: "What influence has price one year on the production of apples the following year?" It is not a question of increased acreage here, but of care given to the crop.

The data herein used are for the Annapolis Valley, Nova Scotia, one of the three important apple-producing areas in Canada. Production figures used are for commercial production and have been obtained from the Dominion Fruit Branch or from the records of G. H. Vroom, Chief Inspector for the Maritime Provinces. The prices used have been obtained from records of the Berwick Fruit Company for the years 1908 to 1911 inclusive and from the records of the United Fruit Companies of Nova Scotia, Ltd., for the years 1912 to 1928 inclusive. While prices of nine varieties were reviewed, for the correlations herein given, only prices of Baldwins have been used, this variety being the principal variety in the Valley. The prices used are for No. 1's as received by the local companies. While prices of other grades are available, an average price covering all grades is not; neither are data available for the proper weighting of the different grades for a representative price. While production data are available starting with 1903, price data are available only for 1907 and succeeding years.

The average price for Baldwins, No. 1's, for the 22-year period, 1907 to 1928 crop-years inclusive, was $3.11. This is slightly less than the average unweighted price of the nine varieties, the average being $3.27. The range for Baldwin prices was from $1.76 for the 1914 crop to $6.05 for the 1918 crop. The 1918 crop was the only crop that averaged more than $4.50 per barrel for No. 1's. The average production for the 22-year period, 1908 to 1929 crop-years inclusive, was 1,090,043 barrels with a minimum production of 322,495 barrels in 1910 and a maximum of 2,145,000 barrels in 1929. Ten of the 12 years in which the price was below the average, the crop the following year was under the average. The two years in which the crop the following year was not below the average were the crop years 1919 and 1922, both of which years were in the high production cycle mentioned elsewhere in this paper. The price for the 1918 crop, also for the 1920 and 1921 crops, was high. Seven of the ten years in which the price was above the average were followed by years in which the production was above the average. The three years in which this did not follow were the crop years of 1913, 1916 and 1924. The first two fell in the low production cycle of 1911 to 1918 inclusive and the low production cycle of 1925 to 1928. The years 1913 and 1916 were each preceded by two low-price years.

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[1] See article by L. H. Bean, "The Farmers' Response to Price," in the Journal of Farm Economics for July 1929, p. 368 ff.

The influence of price one year on production the following year is further shown in table 1.

This table indicates a definite trend to increased production with an increase in price the preceding year. The exceptions to be noted are the extreme production years of 1910 and 1929, the former with a production of 322,493 barrels due to a heavy frost at bloom period, the latter with a crop in excess of 2,000,000 barrels following two years of relatively good prices.[2]

The relationship between price and production the following year is further substantiated by a correlation study. The coefficient of correlation between price and production the following year for the twenty-two year period is $+ .61 \pm .09$, which is significant. The coefficient of correlation between percentage first differences as between price and production is $+ .67 \pm .07$[3] that is, there is a definite relationship between the percentage change in the crop in any year and the percentage change in price the preceding year.

An interesting and doubtless significant feature of the production data

TABLE 1.—RELATION OF PRICE TO PRODUCTION THE FOLLOWING YEAR

Range in price	Number years	Average price	Average production following year
$1.51–$2.00	2	$1.78	632,636
2.01– 2.50	8	2.31	983,342
2.51– 3.00	1	2.54	322,495
3.01– 3.50	4	3.25	1,170,333
3.51– 4.00	3	3.70	1,008,831
4.01– 4.50	1	4.12	2,145,000
4.51– 5.00	2	4.78	1,536,810
Over 5.00	1	6.05	1,600,000
Total	22	3.11	1,090,043

for the period since 1910 is the very definite cycle in production. The year 1910 was followed by the largest crop produced in the Valley up to 1929, with a production of 1,734,876 barrels. There was, however, a decided drop in price and there followed a series of low-production years, the seven crops, 1912-1918 inclusive all being under 1,000,000 barrels. While there were many factors responsible, no doubt relative price of apples as compared with other crops was one of the principal causes. The year 1919 was the first year in a series of high production years, with five years producing more than 1,400,000 barrels a year. Price was no doubt one of the causes of this cycle. The high prices received for the 1918 crop, much of which was marketed at very high prices in the winter of 1918-19, immediately preceded this period. The bringing under control of certain insects in the Valley was no doubt one of the ways in which good prices worked to increase production.

[2] This analysis assumes that production in Nova Scotia has little effect on apple prices in Nova Scotia, which are determined by the export market, and that the off years in Nova Scotia do not coincide with those in competing countries. EDITOR.

[3] Actual price of Baldwins rather than adjusted price was used in the correlation studies. For the percentage first difference correlation, prices for the crop-year 1910 and production for the crop-year 1911 were not used due to production being 538 per cent of production the preceding year, a large crop following a very small crop. Inclusion of this would have resulted in the one year's having too great an influence on the result. The Canadian wholesale price index was then used to correct prices for changes in the price level, but the results were not as significant as those obtained without such adjustment. There are several factors which account for this.

The large crop-year of 1923 was followed by a moderate crop in 1924, and then four crops all under or close to 1,000,000 barrels. It was not until 1929 that another big crop was obtained, the first crop in the Valley to exceed 2,000,000 barrels. The causes of this last cycle of low-production years are not clear, but lower prices in 1922 and 1923 were no doubt in part responsible.

A study of factors affecting yields and farm returns now being conducted in the fruit areas of the Valley indicates a very definite relationship between nitrogenous fertilizer and yield per acre, also between cost of spray materials and yield per acre, and through yields with farm returns.[4] The price received by producers is one of the determining factors in quantity of fertilizer and spray material applied.

This brief article does not attempt to enter into the many other factors that affect production. The notes here given are largely confined to the effect of price. Studies underway indicate relationships between weather conditions and production also between insect infestations and production, which are independent of price.

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ON THE TERM "CHANGE IN DEMAND"

The definition of a change in demand is essentially the following: "Demand is said to have increased when buyers stand ready to take the same quantity at a higher price or a larger quantity at the same price, and contrarily to have decreased when buyers stand ready to take a smaller quantity at the same price or the same quantity at a lower price". The statement is not, however, symmetrical in numerical terms, except in a special case. Thus the statement that there has been a change of 2 per cent in demand is ambiguous, since a 2 per cent change in the quantity taken at a given price may be quite different from a 2 per cent change in price for the same quantity. Restricting the discussion of convenience to curves of constant elasticity by Marshall's definition, the relationship is as follows:

$$\Delta P = \frac{1}{\epsilon}\Delta Q \text{ or } \Delta Q = \epsilon \Delta P$$

where ΔP is the change in demand expressed as the percentage change in price at which the old quantity will be taken, ΔQ the change in demand expressed as the percentage change in quantity which will be taken at the old price, and ϵ is the elasticity of demand.

Thus when the elasticity of demand is less than one, a given uniform shift in the curve will result in a greater percentage increase in the price paid for a given quantity than the percentage increase in the quantity taken at a given price. Contrarily, when the elasticity of demand is greater than one, a given uniform shift in the curve will result in a smaller percentage increase in the price paid for a given quantity than the percentage increase in the

[4] R. P. Longley, Economic Farm Survey in the Annapolis Valley.

quantity taken at a given price. These relationships become evident when curves are drawn on double logarithmic paper. The expression of percentage changes in demand in terms of the increase in quantity taken at a given price appears preferable, since in such terms an increase of 2 per cent in demand would have the same influence as a decrease of 2 per cent in supply.

University of Minnesota *Warren C. Waite*

JULIUS ROSENWALD FUND TRAINS NEGRO FARM ECONOMISTS

The Julius Rosenwald Fund of Chicago, Illinois, a pioneer in stimulating better rural schools for negroes in the South has again taken the lead in providing leadership for negroes in the business side of farming.

Conference of Agencies

On the invitation of the Julius Rosenwald Fund, a conference of the following persons was called at the Georgia State Industrial College, January 24-25, 1930 for the purpose of discussing the advisability of providing for the training of farm economists for the Negro Land Grant Colleges. At this conference the following were present: Dr. C. B. Smith, Chief, U. S. Bureau of Cooperative Extension Service, Alfred K. Stern, Director, Julius Rosenwald Fund, J. A. Evans, Associate Chief, U. S. Extension Service, Mrs. Ida Powell Malcolm, Field Agent, U. S. Extension Service, B. F. Hubert, President, Georgia State Industrial College, W. J. Hale, President, Tennessee State College, T. M. Campbell, Field Agent, U. S. Extension Service, R. S. Wilkinson, President, South Carolina State College, George R. Arthur, Director Negro Welfare, Julius Rosenwald Fund, Arthur Raper, Secretary, Commission on Interracial Cooperation, and J. B. Pierce, Field Agent, U. S. Extension Service. For two days this representative group of educators discussed the great need of trained leadership in farm economics in the Negro Land Grant Colleges. It was the feeling of those present that the weakest link in both the resident instruction at these colleges and in the Extension Service in the Southern States was the work in farm economics.

The conference requested the Julius Rosenwald Fund to assist in the movement to remedy the situation as it effects negroes in agriculture today. The result is that the Fund appropriated $20,000 for the operation of three sectional schools for Negro men and women county agents, which were held from August 4 to 30, 1930, at the South Carolina State College, Orangeburg, S.C.; the Tennessee State College, Nashville, Tennessee; and at the Prairie View State College, Prairie View, Texas. All of the State Directors of Extension Service are cooperating with the U. S. Extension Service in providing the very best possible instruction in these schools where the 333 negro agents are expected to go for special training.

The Julius Rosenwald Fund has also made available 15 fellowships for training of the best possible personnel to be selected by the Negro Land Grant Colleges, at some of the leading universities where strong courses in agricul-

tural economics have been set up. Some of these fellowships are available for demonstration agents who are now at work in the field; some are offered to vocational teachers of agriculture; and others to members of the faculties of the Negro Land Grant Colleges including Hampton and Tuskegee.

It is proposed by the Julius Rosenwald Fund to await the results of the expenditure of the present budget. If at the end of the training period the experiment proves a success it is hoped that the opportunities for training will be made available to every state of the South. It is believed by those who worked out the plans for the training of negro agricultural economists, that with a sufficiently well-trained group of teachers, negro students of agriculture in high schools and colleges of the South will have the practical knowledge of how to take advantage of every opportunity in organizing negro agriculture in a way to provide for larger returns to the individual farmer.

It was pointed out at the conference that approximately 96 per cent of the negro county agents' time was devoted to the production side of agriculture and only 4 per cent to the marketing end of farming. It was also stated that there was not a single department of agricultural economics in any of the Land Grant Colleges offering courses in farm management and marketing. It was also brought out that with recent development of state and federal aid to farmers cooperatively organized, the negro farmer being unorganized, is largely dependent upon the Negro Land Grant College and the negro county agent for information and encouragement in order that he may be able to keep pace with the very latest and best methods in American farming.

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Georgia State Industrial College
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SURPLUS CONTROL IN BRITISH COLUMBIA

Surplus control of deciduous fruits in British Columbia is of interest in that it is a distinctive type in North America in placing reliance upon a Provincial Statute for its carrying out and enforcement.

The genesis of surplus control to be herein discussed took place, as is so often the case with many farmers' movements, amidst conditions which were adverse to the prosperity of the producer. The growing of deciduous fruits in British Columbia, while an industry young in years, had expanded rapidly, and by the end of the War was more than supplying the nearby market, namely, the prairie provinces of Alberta, Saskatchewan and Manitoba. Prosperity ensued until 1922, when the post-war depression seriously hit the growers. From that time onward competition became increasingly severe and it was a case of "Every man for himself and the devil take the hindmost". The marketing of fruits was carried out by one large cooperative and a considerable number of private or independent packers and shippers. It was out of the conflict of interests between the adherents of these groups that the surplus control plan evolved.

Apples are the most important crop and it was concerning them that dis-

cussion was brought to a head. An attempt to dispose of the entire crop on the prairie market would have brought very low prices. While it was, and is, the most remunerative market, a certain portion of the supply had to be sold elsewhere to take advantage of this favorable outlet. The cooperative, with a large percentage of the total tonnage, attempted to do this. A small proportion of preferred varieties such as MacIntosh were sold in New York, but the greater bulk had to be exported overseas, principally to Great Britain. For the latter, returns were very low, and on a number of occasions netted red ink to the grower.

With most of the burden of low priced exports borne by cooperative growers, those selling through private channels naturally reaped the benefit of selling all their produce on the improved home market. Having a portion of the producers receive more for similar grades and varieties than those who penalized themselves to provide better conditions for the whole body of producers, was a condition which could not continue indefinitely. For the time being it developed contention and animosity, engendered hard feelings, and weakened the cooperative.

There were, in addition, minor or contributing factors. One of these, which can be laid at the door of competition, might be called rushing the market. As a variety matured it was rushed to market in order to get the premium for the first supply of the new variety. For instance, MacIntosh would be hurried in before supplies of Wealthy were cleaned up, the Jonathan hard on the market of MacIntosh. In addition, this brought about a tendency for fruit to be shipped before it was properly matured and ripened. Each agency vied with the other with the result that supplies of one variety had to be markedly cut in price in order to get it moved into consumption. This destroyed the confidence of the trade, gave small returns for the latter portion of supply and made no little trouble generally. Furthermore, sales on consignment had been an evil of a malignant type, disrupting and glutting markets, oftentimes yielding low returns, with the result that the grower was sometimes fleeced and the victim of fraud. No adequate legislation dealing with consignment sales was in force and the whole situation was one which needed reorganization.

The thought that all growers should be on an equal footing seemed to grow. That each should have an equal chance, or at least that returns should be equalized, was the recommended course of action. While it was realized that many would be removed from their more fortunate positions, the course of the greatest good for the greatest number was advocated. Only by a removal of a portion of the crop from the home market could the greatest total returns be obtained, and the feeling was that this removal into export market should be shared by all, that each should have the privilege of his share in the high-price market, and that each should bear his proportionate share of the low-price market. At the same time as this major problem should be dealt with, it was hoped that improvements could be affected with "market rushing", consignment sales, distribution, and other fever spots in the industry.

It was felt that any voluntary plan had little hope of success, that of their own free will the whole group of producers would not work together,

and that any portion, however considerable it might be, would only give a greater advantage to those not taking part. Accordingly plans for governmental action were discussed. With people of British culture and under a British type of law, a great deal of confidence is felt in legislative action. Only by a provincial statute setting forth a means of procedure providing penalties for the infraction of such procedure, it was believed, could a successful course of action be undertaken. In 1926 the growers at large, at the annual convention of the British Columbia Fruit Growers Association, requested the Provincial Government to enact what became the Produce Marketing Act, and to set up the Committee of Direction.

During the 1926-27 Session of the Legislature, a bill known as the "Produce Marketing Act" was passed. This provided that a committee should be constituted under the name of the "Interior Tree Fruits and Vegetable Committee of Direction", with exclusive power to control and regulate, under this act, the marketing of all tree fruits and vegetables produced within a certain area. The act does not apply to products except in their fresh or raw state, canned, preserved, evaporated or other processed forms being exempt.

The "Committee" of three members was formed, one appointed by the Lieutenant-Governor in Council, and the other two by the British Columbia Growers and Shippers Federation. This Federation is an incorporated organization of shippers, the directorate of which acts in an advisory capacity to the committee.

Provision for the establishment of other committees is that, where a petition requesting control and representing seventy-five per cent of the producers within a particular area is presented to the government, a committee may be constituted by Order in Council and the product and area placed under control. Two such committees were subsequently formed, one to regulate the marketing of strawberries and bush fruits, and the other potatoes.

The growers upon making their request of the government had in mind certain functions to be carried out by the committee, and centering about those matters which were considered to be maladjustments of the industry. It was desired that exports should be shared proportionately by all, that the distribution be facilitated and evened out according to market capacity, that consignment sales be discouraged or regulated, that prices be fixed, and that times of shipping of a particular fruit or variety be set. In short, the committee was to act as a sort of regulative clearing house, with legal power to enforce the carrying out of its decisions.

The powers conferred upon the Committee are broad, sufficiently broad to provide for the carrying out of the task set before it, and to meet exigencies that might arise. The Committee may fix the quantity of any product which may be marketed in any place by a shipper or the proportion of his supply which may be so marketed; fix the place or places to or from which any product may be delivered or dispatched for marketing; fix the price from time to time and maximum and minimum prices at which any such product shall be marketed by a shipper; require a shipper to furnish complete and accurate reports and estimates of a product which he has or will have for marketing and as to the time or times at which the same will be available. In addition,

it may require the submission of invoices, bills of sale, or the like; it may inspect the books of shippers; is authorized to promote uniformity in methods of marketing and handling; may prescribe terms of sale; and may exempt or revoke from exemption for any shipper, any determination, order or regulation to which he may be subject.

Statute law has few cases of absolute enforcement; some infractions usually occur. Nevertheless, laws which are well designed and executed, generally bring about a large measure of their purpose. So it is with the Produce Marketing Act. It has not been perfect, the human factor has resulted in mistakes, yet when these have been taken into account, the Act may reasonably be called successful. For the greater part the tasks set for the Committee have been carried out.

The high and low-priced domestic and export markets have been equally shared by a compulsion of proportional exporting. "Market rushing" has been stopped by a yearly fixing of dates before which varieties of produce may not be shipped. Instead of the mad rush and unbalancing of the market, the situation has improved to the point where with apples at least, rival railway companies assemble trainloads of a variety in their yards and on the date of release the engines start simultaneously for the haul over the mountains.

Consignment sales, a bugbear for years, have been largely eliminated. This was accomplished as an indirect result of fixing prices of sale. This fixing of prices by grade and variety established an equality to all purchasers on the f.o.b. basis. It has been necessary with the presence of an exportable surplus to fix the level of prices so as to yield the greatest return from the home market. They have therefore been reasonable in relation to market demands in this market, for high prices which would curtail consumption at home would increase the amount to be exported at low prices. Competition from American fruits previous to the very recent increase in Canadian tariff duties on fruits and vegetables was an additional factor in setting the level of prices. This fixing of prices has resulted in a large measure in equalizing returns between growers.

Regarding distribution no positive action has been taken, principally because the situation righted itself. With the abolition of consignment sales, market gluts largely disappeared. It was found as well that established trade channels were placing produce in all markets where it could profitably be handled and the problem in large part had ceased to exist.

Surplus control plans of various sorts are being attempted. By some they are thought to be problems of production; by others, problems of marketing. Each approach merges into the other. Almost every surplus plan proposed has different aspects and methods of approach, giving rise to various means of control. These notes outline a type of control that is being carried on under Legislative action.

L. D. Mallory

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BOOKS RECEIVED

Black, J. D. and Black, A. G. *Production Organization.* Henry Holt & Co. P-XI. 646 p. $3.75.

Gide, Charles. *Communist and Cooperative Colonies.* T. Y. Crowell & Co. 216 p. $2.50.

Thompson, Warren S. *Danger Spots in World Population.* A. A. Knopf. 343 p. $3.00.

Vaile, Ronald S. and Slagsvold, Peter L. *Market Organization.* The Ronald Press Company. 498 p. $4.00.

Stokdyk, E. A. and West, Charles H. *The Farm Board.* Macmillan. 197 pp. $2.00.

BOOK REVIEWS

Einführung in die Wirtschaftslehre des Landbaus von Dr. E. Laur, Professor an der eidgenössischen technischen Hochschule in Zürich ("Introduction to the Economics of Agriculture" by Dr. E. Laur, Professor in the Federal Technical College in Zürich, Switzerland). Paul Parey, Berlin, 1930, 20 Marks, $4.80.

This recently issued text (written in German) by Professor Laur represents a partial revision of his first edition (1920) in that certain sections have been expanded and brought up to date through the inclusion of recent findings. Particularly is this true of his section on Agricultural Labor. During the past ten years considerable attention has been given to this field in Germany.

The book presents 346 pages of interesting, instructive, and throughly readable material; a very comprehensive subject-matter index, a colorful lithographic map portraying the various types of farming to be found in the world today. Use of large, legible Roman type makes for easy reading.

Laur considers six major subject-matter fields in his presentation. These are as follows: the "Historical Evolution," "Systems and Methods," "Factors in Agriculture," "Principles of Organization and Operation," "Farming Types," and "Farm Accounting and Farm Returns." To these he apportions the space in his treatise respectively as follows: 11 per cent, 3 per cent, 28 per cent, 7 per cent, 30 per cent, 21 per cent.

A further examination of the thesis as presented in the body of the various chapters may best be summarized in Laur's own words:

We quote from the preface to the first edition (1920); "Modern developments have substantiated the concept that the results of agricultural enterprise depend not only on the technical skill and the practical experience of the operator but fully as much upon his ability to solve the economic problems. While the necessity of supporting the subject matter knowledge by means of a broad scientific foundation is generally acknowledged in the field of technical production, the economics of agriculture does not always achieve the same recognition through the application of scientific methods. Certainly, giving the practical farmer, and particularly the small farmer, advice for his farm operations belongs to the essential and fruitful opportunities of economics. But in that, economics has not exhausted its possibilities: That may well be considered its keystone but one which can rest securely only if it is built on a firm foundation. This foundation consists of an intelligent selection and application of the methods of research, in a critical presentation of the historical evolution of that which now is, in a discriminating grasp of the concepts, in the description and analysis of the farm business, in the search for principles in the course of economic events and in the building up of a systematic body of knowledge."——"This book is not intended to be a manual nor yet a systematic school and textbook but more a book for easy reading."

Laur's treatment of the historical evolution of the economic relationships of agriculture sketched in broad lines, traces man's choice of the alternative

methods of winning a living from nature beginning with prehistoric times, through the Celts, the Romans, the predecessors of Europe's barbarian tribes, the feudal order and into the twentieth century. From a close contact with the remains of all that has gone before and in that strategic position which Switzerland holds geographically, Laur here also appears to have stood in the midst of all that has transpired and sketched its movement. He traces in some detail the feudal development, the peasant struggles and final emancipation and the effect thereof on the utilization of agricultural resources. To Thaer of Germany is given credit for presenting the concept of the private economic enterprise with maximum net returns and not maximum physical production as the farmer's aim. Laur's presentation of agricultural improvement following Thaer and Liebig (nineteenth century) and the consequent depression in sheep and wool and finally grain due to overseas competition (America) and the accompanying rise of economic consideration of farm operation are strikingly modern in their similarity to current happenings. To him who thinks of the present agricultural crisis as being something new we can well recommend the limited but effective presentation by Laur of the historical evolution of economic relationships in agriculture as depicted in this chapter.

The foundation of every science, says Laur, "consists of a good system, a discriminating terminology and a carefully thought out, intelligently applied, method of research."

Laur's "System" includes the following component parts:

Field of Agriculture
- Technical Agricultural Production
  - Plant
  - Animal
  - Technical Accessory Business
- Economics of Agriculture
  - Operator—Private Economic Interests
  - Society—Social Economic Interests

I. Economic and Legal Relationships
II. Agricultural History
III. Farm Management
  1. Problems, System, Methods and Bibliography
  2. Elements of Farm Business—Factors of Production (Analytical Part)
  3. Combination of the Factors of Production (Synthetic Part)
    (a) Combination of Factors of Production Organization of Farm Business
    (b) Organization of Farm and Operation
    (c) Relationships of Farm to External Economic order
    Appenda—Agricultural Geography
    Agricultural Cooperation
IV. Farm Accounting
  Bookeeping, Advance Estimates (Budgets), Post Estimates, Statistics
V. Farm Valuation
VI. Agricultural Policy
VII. Rural Sociology

This rather elaborate delineation he himself admits he cannot follow in his text due to limited space.

Laur takes opportunity to establish his position as the leading exponent of the inductive school (in contrast to Aereboe, of Germany, whose method is primarily deductive). The comparative-statistical method, using the "Law of Great Numbers", in which the individuality of specific instances is found to retreat while the great central tendency emerges, he advances as the method to be preferred. This portion characterizes the socio-economic attitude which grows out of such consideration. In contrast one might cite the study of individual differences instead of central tendencies in order to obtain a basis for individual and group organization and operation.

"Nature", to Laur, is the "land" of English speaking economists. And as land to the economist is more than merely superficial area, so Laur also includes all that accompanies land in agricultural production. Nature, to Laur, includes all that natural science has given us. And here he adds an interesting thought—"landwirt" in the German, or land husbandman, he says, is really a misnomer. Far more is the farm operator a husbandman of plants and animals than a husbandman of land; for throughout all the untold eons of time when soil, climate, water—all the qualities of land lay available to man, it was only after the mists of ignorance had cleared away from the secrets of heredity, selection and increase through controlled production that agriculture—husbandry—gradually emerged. The economics of agriculture has as its objective, the choice of all that natural science makes possible for the farmer; but a choice based primarily on its economic feasibility when alternative opportunities are compared.

The question of agricultural labor, Laur defines as follows: "The study of agricultural labor is the study of the increase of the economic utility of farm labor or the study of the principles, which prescribe how agricultural labor may be organized, used, and directed in order to obtain the largest continuous entrepreneural income, and at the same time to improve the condition of the laborers in relation to wages, labor demands, health and welfare."

The largest labor crews employed on large estates undoubtedly give to a study of farm labor in Europe an impetus hardly possible in the United States. To what extent this is applicable to the American family farm with only part time or often no hired labor at all is difficult to predicate. Undoubtedly much that is valuable for the individual, self employed operator can be gained from a study of fatigue, the psychology of workers and similar elements. Our American farm operators, from their own actions, are apparently far more interested in sloughing off all possible labor tasks by the introduction of mechanical equipment. Insofar as this is economic, insofar as it "pays", obviously this is commendable. There is, however, also much to commend in a purely scientific study of the elements of labor involving both economic, psychological, aesthetic and ethical grounds. Laur's presentation, while having possibly little of direct use for our peculiarly different conditions, might well form the basis of further scientific study here.

This section represents a considerable enlargement over the previous edition due primarily to the increase of the subject matter literature pertaining to the field, the establishment of several experiment stations (in Germany) for the study of farm labor and the rather intensive development of the subject

matter by several of Germany's workers in the field of agricultural economics.

Capital in the service of agriculture brings Laur to a field in which he feels thoroughly at home due to his long years of experience in farm accounting investigations as head of the Swiss Farmers Union. The divisions of the farm capital, their valuation and the ramifications into which this leads him, presents nothing particularly new to American readers other than the typically Teutonic quality of being painstaking and detailed. Although Europeans have always criticized American workers as being careless in the matter of valuation and appraisal this may be explained by our rapidly changing conditions. Production practices, productive organizations and the returns therefrom are rapidly changing with us. The product value of our capital goods is not at all a fixed matter, and despite the abortive attempts of some of our farm management workers to teach other concepts, our farm operators gererally realize that cost once incurred has little to do with value, but that instead products gained will have a far greater effect in establishing the value of production goods. The more settled European conditions, growing out of years, yea, centuries of economic background may have a lesson for us in picturing what may be before us. Here, however, as in any forecasting, great caution is necessary and we truly say what *may be* not what *is*, before us.

What are the principles covering the organization and operation of a farm business—"the question of intensity, the law of diminishing returns and the economic considerations of feeding and fertilizing" are the elements taken up directly in Laur's chapter on "General Principles of Organization and Operation". One apparently does not find the terms, "capacity" and "efficiency" in the German literature. One does find, however, a maximum attention given to the question of intensity, the application of varying quantities of labor and capital to fixed units of land. Where land is as scarce as it is in Europe, absolutely and relatively, the question of intensity does properly become of greater moment than it has in the United States where land has, until recently, been absolutely and relatively plentiful. Is this European picture also a forecast of what we may face? It may be. Perhaps the solution of the problem of the organization and operation of the farm is, as Laur puts it, merely the solution of an example in accounting. But, as the premises in a syllogism in logic may have a decided influence on the conclusion, so also here the values used in the accounting example will have a varied effect upon the solution of the problem of the organization and operation of the farm.

This section on the principles of organization and operation could well have been treated in connection with the sections on accounting and advance computation (farm budgeting). The section on accounting present a rather thorough description of farm accounting and a comparison of several methods of bookkeeping. Both simple and cost accounting (doppelte accounting) methods of farm accounting are treated. It is to this latter, the cost accounting (doppelte accounting) that Laur accords the greatest merit as a tool for the advance computation of farm earnings. The exactitude of his computations, the degree of confidence he places in the values computed within the closed circle of his accounting, the results he achieves with these same values when

used in his advance computations will hardly find substantiation among local workers in farm management and agricultural economics. While we are truly advocates of farm budgeting or advance computations we are not willing to espouse the methods of the cost accountant in agriculture as devotedly as is done in this introduction. This does not necessarily disqualify Laur's work. It may be that under European conditions his methods are more nearly workable than they are under our conditions where our technique and consequently our entire attitude is still in a state of flux.

It remains to say a word regarding the types of farming as protrayed by Laur. This section, modelled upon the work of von Thuenen in his "Isolierte Staat" is like the balance of the book, highly interesting and thoroughly instructive and represents the results of considerable effort involving both original research and compilation. Illustrated by his new world map showing the farming types under the influence of commerce and population density, the various "zones" are made to stand out graphically in a characteristically thorough Teuton manner.

Taken as a whole Laur's "Introduction to the Economics of Agriculture" should rank very well among similar texts published in the United States. It is not a treatise on Economic Theory or Production Economics as we know these subjects and cannot be compared directly with such treatises. As an introduction to the field which it portrays, as a book for reading in the economics of agriculture, it offers a delightfully interesting and definitely worth-while contribution to the literature which should appeal to the more mature mind as well as to the beginner who seeks to stray outside his own language.

Walter J. Roth

Bureau of Agricultural Economics

The Elements of Marketing by Paul D. Converse New York: Prentice-Hall. 1930. pp. xix, 1080. $4.00.

This volume represents much more than a revision or addition to the author's "Marketing Methods and Policies," (1921, rev. 1924) which it is intended to replace. Many new features in organization and greatly increased bulk make it in most respects an entirely new piece of work.

Teachers of marketing will be greatly interested in Professor Converse's attempt to combine the functional, commodity and agency (institutional) approaches in a formal fashion. Text book writers commonly have emphasized one or two of these approaches or have mingled them in an uncertain fashion. Professor Converse devotes Part I to "Functional Marketing", Part II to "Commodity Marketing", Part III to "Institutional Marketing", and Part IV to "Marketing Problems and Policies".

Under Functional Marketing one finds an enumeration and analysis of functions, with a detailed presentation of only Transportation, Storage, and Standardizing and Grading. Selling and Advertising are examined in detail in Part IV which deals with Marketing Problems and Policies; the discussion of trading in futures and speculation which usually is discussed in connection with risking is found in Part III as part of the analysis of Organized

Produce Exchanges; financing for the most part is examined in Part IV in connection with a discussion of the coordination of business policies. Among the functions enumerated there appears a new one, as far as text books go,—Recording (accounting) which is listed with financing and risking as a "general business functions".

Part II. Commodity Marketing, has chapters dealing with Problems in Marketing Farm Products, The Cooperative Marketing of Farm Products, and the marketing of the following commodities: cotton and tobacco, dairy and poultry products, fruits and vegetables, industrial goods, and service. Chapter XIV on Marketing Service represents the first major attempt to organize this field for text book purposes.

Part III, Institutional Approach, indicates the general trade channels and the historical development of marketing methods and analyzes in detail Direct Marketing, Brokers and Sales Agents, The Sale of Goods at Auction, Organized Produce Exchanges, Wholesalers, Retailers, Integrated Retailers, Cooperative Marketing, and Trade Associations.

Part IV, Marketing Problems and Policies deals with Fair Competition, Expenses and Profits of Marketing Concerns, Purchasing and Stock Turnover, Price Determining Factors, Price Policies, Market Research, Choosing a Method of Distribution, Selling and Advertising, and the Coordination of Business Policies. Obviously, this division of the book is the catch-all for those things which refuse readily or at all to categorize themselves elsewhere.

The Conclusion deals with the general problem of reducing marketing costs.

The entire volume gives evidence of an intensive combing of sources. The bibliography is more detailed than in any other marketing text. An extraordinary range of material is included in the 1080 pages; so much so that the volume is better adapted to upper division work than for beginning courses. One of the best features of the volume from the standpoint of advanced students lies in the comparison of the general approaches to the study of marketing.

No doubt many teachers of marketing will disagree with certain particulars in the functional enumeration, since there is no complete agreement as to functional categories. More serious disapproval is apt to appear over the classification of goods employed. After enumerating other classifications the author adopts a "short classification" of Farm Products, Industrial Goods and Consumer's Goods. Under this Classification the bulk of the material in the book deals with farm produce and there is no formal separate discussion of the marketing of consumer's goods. Many will disagree, too, with the division of consumer's goods into only two classes, convenience goods and shopping goods. However, classification is a task of extraordinary difficulty in marketing study and there is considerable justification for the use of a simple classification in a general text book. The classification employed makes the work better adaptable to courses where the dominant interest is agriculture.

E. T. Grether

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Cooperative Marketing of Agricultural Products by Newel H. Comish. New York: D. Appleton Company, 1929. XXII—479 pp. $3.50

This book differs from four or five other texts in the field of cooperative marketing of agricultural products in the United States chiefly in its scope and arrangement. In point of view and critical judgment it has little to distinguish it. Unlike some of the other texts, with which teachers of cooperative marketing are familiar, this book covers, by a uniform and indiscriminate treatment, cooperative enterprise among farmers in all important commodity trades. The author makes little or no attempt to center attention upon specially selected cases of cooperative enterprise, and to examine these systematically, for the purpose of discovering empirical truths concerning the character and technique of cooperative marketing undertakings. Fifteen chapters, comprising Part I, survey the extent and progress of agricultural cooperation in the marketing of agricultural products, and the purchasing of supplies. Part II deals with "Special Cooperative Problems" and Part III with "General Farmers' Organization." Covering so much ground, the author has had little opportunity for special emphasis and analysis of particularly productive and significant cooperative agencies and of outstanding failures. It must also be said that many of the data presented on the present status of cooperatives were not the most recent information available and that important recent developments are entirely omitted. On the other hand, as a general outline of the subject, this book will give excellent service. While the treatment of cooperative agencies is perfunctory and in several instances marred by serious omissions, as for example Chapter XIV on Cooperative Livestock Associations, which contains no reference to The Western Cattle Marketing Association or to the National Order Buying Company, the problems dealt with in Part II are well selected and discussed in an interesting and stimulating manner.

On the whole, this book will better serve the instructor than the beginning student. For the instructor it provides a comprehensive outline filled in with more or less well considered opinions which he will be able to evaluate, and perhaps accept as empirical laws or principles. He will be able to supply the essential knowledge of cooperative technique as well as that of the circumstances and conditions surrounding the initiation and course of cooperative enterprises. But the beginning student is likely to be thwarted and confused by a treatment of the subject so deficient in the vital elements for constructive thinking and understanding. A case in point is the discussion of the "Comparative Services of Centralized and Federated Associations", page 259. It is suggested that a weakness of the centralized type is the difficulty encountered in giving the member a sense of control and importance in the association. Further, it appears that federations emphasize improvement of marketing services while centralized associations aim at price fixing. After all, how relevant and conclusive are these propositions? How can one really understand these types of associations without a comparative study of well selected examples? The author virtually concedes inadequate treatment of the question when he states that "Probably the better position to take is to say that each type has its strength, and each type has its weakness."

The view that, "cooperatives cannot arbitarily set prices," in whatso-

ever way they may be organized, will encounter few dissenters among students of the subject. Of greater interest are the many ways in which cooperatives may be instrumental in enhancing prices for their members. These methods make it clear that effective cooperation does not necessarily depend upon the control of the bulk of the products. Control of the product does not give control of price. Consequently the efficacy of cooperation does not lie in power to control price, because in reality there is no such power to be had. Control of prices in this connection is discredited doctrine. The appropriate concept for cooperative agencies is adjustment to price.

This concept places the question of volume and inclusiveness of the enterprise upon quite a different basis. Upon this basis it becomes merely a matter of efficiency. For efficiency in operation, volume is indispensable, but not necessarily total volume or even a significant fraction of the total supply. "In fact, a business may be quite too large as well as quite too small to become efficient."

Cooperative marketing associations are farmers' instrumentalities for efficient operation in the sales department of their businesses. They are no more price fixing or price control agencies than the sales department of any other business. Only indirectly do they affect market price. As they multiply, and extend their membership, enabling an increasing number of farmers to function more efficiently as producers of a given market commodity, they bring about a better adjustment of supply to market demand and thereby reduce price fluctuations as are caused by irrational variations in supply.

The strictures placed by the author upon price determination by cooperatives amount to a theory of cooperative marketing in agriculture that the reviewer believes is most logical and useful. Unfortunately, though, he fails to make it sufficiently explicit for the student and to reveal its implications for the practical problems of cooperative technique. Let us again refer to his discussion of the relative advantages of the centralized and the federated types of organization. Thinking of this question in terms of an inclusive organization system for farmers in a given commodity trade, we might logically deduce from this efficiency theory of cooperation, (a means to greater efficiency in supplying a market) some principles or organization that have considerable empirical validity. Many facilities and services required by farmers in assembling and preparing commodities for sale are essentially local in character. That is to say that they may be established economically by a local group of farmers who desire to provide themselves with such facilities and who are able to finance them. An example is a local grain elevator enterprise, a creamery enterprise, a produce packing establishment, or a local livestock assembly and sales agency. Such a facility serves only a local group. Since complete and efficient utilization of it is entirely dependent upon local patronage, its operation and administration in a cooperative system are logically a local enterprise. But such an enterprise in its turn may discover that it is making the same market contacts and employing identical marketing agencies as similar local cooperative enterprises within a particular region or district. If and when this becomes true, it may federate with its neighboring enterprises in order to place certain distributive and sales activities on a more efficient basis. Here again it is purely a matter

of efficiency of operation; not a device for reducing competition among cooperatives or of controlling their markets. And so cooperative sales systems may extend themselves, constantly striving for most efficient operation until several have developed in a given community trade. Let us suppose that this has occurred; that each regional has a volume of business that fully employs it, is able to fill even the largest available orders and would not be able to reduce overhead expense by combination. Up to this point farmers have gained in sales efficiency through the device of cooperative enterprise what industrialists have achieved through the capitalistic corporation.

What more is to be achieved by farmers through cooperative selling? At this point it may appear that a projection of cooperation would be quite analagous to cooperative efforts of large scale competing industrialists for "rationalizing" their respective industries. The technique required would be that of the trade association rather than that of the sales department of a large scale industrial enterprise. If the analogy with organization in industry is reasonably complete, a central cooperative, formed by federation of the regionals of our case, would not be designed for the purpose of centralized selling and commercial control over the movement of the product in the trade, but rather for the purpose of "stabilization" of the agricultural industry represented. At any rate at this level, cooperation appears to take on a new significance that makes it functionally different in character from cooperation for commercial proficiency.

In accordance with this line of reasoning we might conclude, concerning the question of type of organization, that cooperation for commercial efficiency in marketing is projected on the basis of units defined by the requirements of efficient operation of the appropriate facilities and services. The system evolves by a process of federation of competing units until given units have reached a point of maximum commercial efficiency with respect to all marketing services and facilities required by farmers. Upon such units as a basis, a central agency may be created to deal with the common problems of "stabilization" and "rationalization" of the agricultural industry represented. It would appear quite possible finally to validate these logical conclusions or generalizations empirically by case studies of cooperative systems that are evolving in this manner and by analytical study of organizations that appear to be exceptions. If this is true, the question of the "comparative services of centralized and federated associations" would be resolved. Other problems of cooperatives and questions concerning the place and importance of these agencies in the marketing of agricultural products would yield themselves to a more thorough analysis than the author has given them.

Iowa State College *Paul L. Miller*

Some Trends in the Marketing of Canned Foods. by Lyon, Leverett S. The Brookings Institution. Pamphlet Series, vol. 1, no. 4. Dec. 1929. 57 pages, 26 charts.

As stated in the introduction "this pamphlet outlines certain trends in the marketing of canned foods. It does not pretend to deal exhaustively with every phase of recent change, but to present with quantitative measurements

observations concerning a number of the more important problems which have been much discussed in the industry.'' The discussion is centered around the trend of hand to mouth buying and its manifestations.

The author finds that hand to mouth buying has been increasing as evidenced by the decline in advance ordering, increase in the proportion of small orders, increase in the ''stock burden,'' and the tendency toward greater stability of shipments throughout the year. Contrary to the prevalent opinion among canners, however, hand to mouth buying did not begin in 1920, nor has it increased continuously since then. The author cites evidence to show that there have been periods of marked weakness in futures buying many years before 1920 and that since 1920 there has been considerable variation from year to year in the ratio of advance orders to sales.

The increase in the proportion of small orders which accompanied the tendency toward hand to mouth buying increased the canners' cost of distribution. According to their own reports canners have not succeeded in passing on to consumers the added cost of the small orders. No mention is made as to whether the added costs have been passed back to the producers.

The study is largely based upon data obtained by questionnaires from 52 canners. All of the canners reporting did not, of course, furnish data on all items. Except in a few instances, however, such as the sizes of orders for canned salmon for which data from only two canners were obtained, the number of records is adequate.

Those interested in the marketing of particular canned foods, such as corn, peas, or peaches, will find much valuable information since the data are segregated on the basis of individual products.

No indications are given in this study as to the probable directions of the trends of futures buying, size of orders, seasonality of shipments, and carryover during the next few years. Nor does the author attempt the problem of determining how the disadvantages of hand to mouth buying can be modified. Those directly connected with the canned food industry would undoubtedly appreciate information along these lines. Nevertheless Mr. Lyon's study is a valuable contribution to the subject of marketing canned food.

University of California *H. R. Wellman*

Market Organization by Roland S. Vaile and Peter L. Slagwold, New York. The Roland Press Company, 1930. 498 pp. $4.00.

During the last few years there has been a flood of new books purporting to deal with the general principles or theory of marketing. Several of these books have failed to add much to the sum total of knowledge in this field of economics; they have merely stated the same principles in different words and in different order. Furthermore, there has been a tendency in some of the books to crowd in so much minute description of market structure and the practices surrounding the marketing of particular commodities that the more fundamental principles have been relegated into the background or obscured in a maze of detail.

It is thus with considerable misgiving that one commences to read a new

book on marketing. "Market Organization" appearing under the joint authorship of Roland S. Vaile and Peter L. Slagwold, however, is an advance on many recent books, not so much because of what is new in the book, but because of the authors' method of approach to the problem of marketing and their organization of material.

The authors state that they had three reasons in mind for undertaking the book. (1) The dynamic situation with respect to marketing requires frequent up-to-date presentation; (2) the "architectural design" of the book is claimed to be new and a useful approach to a course in marketing; (3) current writings in the field of marketing are so voluminous and contradictory that a winnowing of some of the wheat from some of the chaff seemed worthwhile.

The theoretical aspects of the problem of marketing receive more emphasis than is usual in elementary text books on this subject. The importance of the market is stressed (1) as a price making institution, and (2) as a mechanism for the efficient distribution of commodities. The authors consider that the text material provides a useful framework into which more elaborate descriptive material dealing with the marketing of specific commodities may be fitted. This, in the opinion of the reviewer, is the proper attitude to take up. It gives the student a better perspective of the principles of marketing and equips him more fully to undertake at any time a more detailed analysis of the marketing of particular commodities. This is very important, for there seems to be an unfortunate tendency among professors, lecturers and teachers to burden the student with so much detail that the theory and principles are lost sight of or are imperfectly comprehended.

Theirs is not a functional approach to the problem of marketing. While an appreciation of functions is regarded as essential to an understanding of marketing, the authors deal with functions as a background "against which may be displayed the marketing institutions and the methods followed in distributing particular commodities". Functions are introduced in a preliminary way in Chapter III.

Chapters IV to XIII deal with the involved problem of prices. The interrelationship of supply and demand, the effect of risk and uncertainty, and the market structure for prices are simply and clearly set forth. The chapter on price policies is particularly instructive in that it summarizes and explains many of the most modern methods adopted by manufacturers, wholesalers and retailers to establish prices for their commodities. It helps the student to understand some of the apparent price anomalies. The chapter on market research is also of great interest as it enumerates some of the latest methods used in market research whereby risks may be avoided, reduced or passed on to wider groups.

The importance of transportation and some of the more recent changes in this field are dealt with in Chapters XIV and XV. In the last few chapters are presented some of the developments and tendencies in group, cooperative and state control of marketing.

The authors have a concise, crisp style of writing, which makes their book "easy reading"—an important attribute for students taking up a course in marketing for the first time, or for the general reader. The illustrations (graphs

and tables) appearing in the body of the text are simple and easily understood. Some more complicated charts showing in greater detail the ramifications of market organization for particular commodities are wisely relegated to an appendix.

It would serve no useful purpose to go into a detailed analysis of individual statements appearing in the book. While here and there statements appear which are open to a difference of opinion, the authors have succeeded to a great extent in clearing up many of the obscurities appearing in some of the recent writings on marketing. The chief virtue of the book is the perspective of the problem of marketing presented to the reader. Taken on the whole the book contains a moderate, well-balanced statement of the principles of market organization and of some of the problems connected therewith. It should prove useful and helpful in an elementary course in marketing either as a text book on principles or as a basis on which to build detailed analyses of particular commodities. While it deals with marketing generally it introduces enough illustrations and contains sufficient reference to the marketing of agricultural products to be used in a course which is concerned mainly with the disposal of agricultural products. In fact it should prove a distinct advantage for those interested in the marketing of agricultural products to obtain some conception of the problems connected with the marketing of manufactured products. The book should also be of interest to the general reader desirous of obtaining some knowledge of the subject of market organization.

James M. Tinley

University of California

NEWS ITEMS

Fourth Annual Convention of the Western Farm Economics Association

The Fourth Annual Meeting of the Western Farm Economics Association was held at the Utah State Agricultural College, Logan, Utah, June 10 to 14, 1930. There were 72 representatives at the meeting from various institutions of ten western states. In addition, the Federal Farm Board and a number of Bureaus of the United States Department of Agriculture were represented. The program included subjects which are of special importance to western agriculture. In general, the subjects considered were trends toward large scale farming and the outlook for irrigated farming as power farming increases, research in local and national outlook work, farm management extension work, the agricultural marketing act as it applies to the West, and the value of the public domain to the western states. In addition, a two-day seminar on research in agricultural economics was conducted by Professor H. R. Tolley, Giannini Foundation, University of California.

The proceedings of the convention are now in preparation for publication in mimeographed form. The published proceedings, will contain, in addition to a report on the general business of the Association, the following papers which were presented at the convention:

"Trends Toward Large Scale Farming in United States"
M. L. Wilson, University of Montana.

"Large Scale Farming in the Palouse Wheat District"
Paul A. Eke, University of Idaho.

"Effects of Large Scale Operation on Types of Farming in Wyoming"
Harry Pearson, University of Wyoming.

"Outlook for General Irrigated Farming as Power Farming Increases"
R. C. Burdick, Colorado Agricultural College.

"Policies and Plans with Respect to Operation of the Agricultural Marketing Act"—Leo Stuhr, Representative, Federal Farm Board.

"Agricultural Marketing Act with Special Reference to How it Will Affect Western States"—H. E. Erdman, University of California.

"The Regulation of Agricultural Production"
N. H. Comish, Oregon State College.

"Some Economic Aspects of the Washington Apple Industry"
C. C. Hampson, State College of Washington.

"Research in Local and National Agricultural Outlook Work"
H. R. Tolley, Giannini Foundation, University of California.

"Farm Management Extension Work"—H. M. Dixon, in Charge of Extension Work in Agricultural Economics, U. S. Dept. of Agriculture.

"Value of Public Lands to Western States"
A. F. Vass, University of Wyoming.

"Use of Nomograph Charts for Dealing with Factors in Economics"
F. B. Headley, University of Nevada.

Summary of Seminar on Research in Agricultural Economics, which was conducted by H. R. Tolley, Giannini Foundation, University of California.

The officers elected for 1931 are:

President—W. Preston Thomas, Utah State Agricultural College, Logan, Utah.
Vice-President—E. F. Dummeier, State College of Washington, Pullman, Washington.
Secretary-Treasurer—Paul A. Eke, University of Idaho, Moscow, Idaho.

The 1931 meeting of the Association will be held during the early part of June at the State College of Washington, at Pullman, Washington.

Second International Conference of Agricultural Economists

The second International Conference of Agricultural Economists was held at Cornell University, Ithaca, New York, August 18-29, 1930. Over three hundred persons attended the sessions, including representatives from nearly all the states and fifty or more persons from other countries. About fifteen foreign countries were represented, including Canada, Great Britain, Germany, Finland, Denmark, U.S.S.R., Poland, Bulgaria, Australia, New Zealand, China, Japan, South Africa, and Mexico.

The program was about equally divided between American and foreign papers. Agricultural surpluses, public policy toward agriculture, taxation, land utilization, credit, farm management, farm accounting, marketing, cooperation, prices and other matters were included among the subjects of the formal papers.

Special interest was shown in the series of papers and discussions dealing with the agricultural depression, its causes and probable duration. Different viewpoints on these matters were presented by R. R. Enfield and E. M. H. Lloyd of London, Professor Max Sering of Berlin, and Dr. E. G. Nourse and Dr. G. F. Warren of the United States. Professor Sering emphasized the influence of the limited purchasing power of the Germans and other peoples of Central Europe. Other speakers emphasized the effect of inflation and deflation and showed how agriculture, because of its slow turnover and high fixed charges, is seriously affected by changes in the price level.

Preceding the conference, a group of foreign delegates were conducted on an inspection trip through the New York City markets by representatives of Cornell University, and on a bus trip through the Middlewest by Professor H. C. M. Case of the University of Illinois.

At the close of the conference a formal organization was set up. Mr. L. K. Elmhirst of Dartington Hall, Totnes, England, was elected president, Dr. G. F. Warren of Cornell University, and Professor Max Sering of Berlin, vice-presidents, and Mr. J. R. Currie of England, secretary-treasurer. An advisory council was also provided for.

It is probable that the proceedings of this conference will be published, although definite arrangements have not yet been made. Announcement regarding the availability of copies of the proceedings will be made in a later number of this Journal.

The Perishable Agricultural Commodities Act, 1930, signed by the President on June 10, is of extraordinary significance to the fruit and vegetable industry. Handlers of fresh fruits and vegetables must take out a Federal license under the act, which will have the effect of elevating and standardizing trade practices in the industry. Administration of the act will be by the Bureau of Agricultural Economics, with the organization necessary for its enforcement developed as part of the Fruits and Vegetables Division, W. A. Sherman, in charge, and F. G. Robb, Associate Division Leader, supervising the regulatory work.

An Inter-American Conference on Agriculture, Forestry, and Animal Husbandry was held in Washington, D.C., September 8-20, attended by research men from the 21 American republics. One section of the program was devoted to round table discussions of problems in agricultural economics.

An experimental cotton gin and laboratory is being erected at the Delta Branch Experiment Station, Stoneville, Mississippi, as an important facility in the study of fundamental principles of cotton ginning and cleaning, and of the relationships between the properties and condition of seed cotton. It is expected that the results obtained at the laboratory will contribute materially to the improvement of the spinning quality of American cotton.

A comprehensive study of the economic and social opportunities of the farm population of Knott County, Kentucky, has been undertaken by the Kentucky Agricultural Experiment Station, in cooperation with the Bureau of Agricultural Economics, the Bureau of Home Economics, and the Forest Service, United States Department of Agriculture.

A 5-year project on farm reorganization on about 40 farms in four counties in eastern North Dakota has been begun by the Department of Farm Management of the North Dakota Agricultural Experiment Station in cooperation with the United States Department of Agriculture. Mr. H. R. Danielson, formerly county agricultural agent in Steele County, North Dakota, has charge of the field work.

Farm accounting is a part of the prescribed course of study for consolidated schools in North Dakota. The text used is the fourth edition of the manual "Simple Farm Accounts", by Rex E. Willard, together with a "Teacher's Supplement". The "North Dakota Farm Account Book" is used for practice work in the course. A comprehensive outline of the course has been prepared for the use of teachers who have not in general had experience with the subject or with farming. Somewhat over 200 schools are now giving the course.

Field work on the farm management aspects of the bulk-handling of grain from combines has been done in Idaho, Oregon, and Washington, by Neil W. Johnson, of the Bureau of Agricultural Economics, in cooperation with the

State Colleges. The study is designed to throw light on the problem of the cost and possible gains from shifting from sack-handling to bulk-handling of grain on the farm.

Two part-time assistantships have been created at the Kansas State Agricultural College. W. H. Atzenweiler, formerly county agent of Brown County, Kansas, and J. H. Cooldige, formerly county agent for Gray County, Kansas, have been appointed to these positions for the academic year 1930-31.

The second annual Cotton Grade and Staple School was held early in August at Oklahoma City, Okla., in the classing rooms of the Oklahoma Cotton Growers' Association. One hundred cotton buyers, local receivers, and farmers attended. Professor O. W. Herrmann, of the Oklahoma A & M College, conducted the school, with the assistance of lectures by cotton experts from the Department of Agriculture and from the trade in the Southwest on various phases of cotton marketing.

A meeting of the Southern Economic Association is to be held in Atlanta, Georgia, November 14-15, 1930. Professor C. E. Allred, of the University of Tennessee, has charge of the program of the agricultural economics section as chairman.

Two new projects have been undertaken by the Department of Agricultural Economics at South Dakota State College. One of these is a study of the development of large-scale farming in South Dakota. The other is a study of cattle range management in the northwestern part of the State, a follow-up of the range cattle study recently completed by the Bureaus of Agricultural Economics and of Animal Industry in cooperation with South Dakota, North Dakota, Montana, and Wyoming Colleges of Agriculture.

New courses at the University of Nebraska include extension courses in Farm Organization, by A. W. Medlar, and courses in Agricultural Credit, and Money and Banking, by K. M. Arndt, of the Department of Economics. R. H. Cole has been stressing work on cost of producing wheat and corn, and cost of tractor operation.

Tomatoes for canning are now included in the system of U. S. standards for fruits and vegetables. The issuing of grades for fruits and vegetables egan in 1917 with grades for potatoes. Now there are U. S. grades for 46 mmodities, with 59 sets in all, some commodities having two or more sets.

nnini Hall at the University of California has been completed and the Agricultural Economics group—teaching, research and extension—will ogether in its new headquarters on the second floor of this building.

courses in Agricultural Economics are being given this year at of California. One is a year's course on Analytical Methods Economics by H. R. Tolley, and the other is a seminar on the

Marketing of Agricultural Products by H. E. Erdman, E. A. Stokdyk, and J. M. Tinley. The seminar on Agricultural Policy formerly given by Professor Erdman is now being given by George M. Peterson.

The National Cooperative Council, a conference body of agricultural cooperative marketing and cooperative buying associations, organized at Baton Rouge, Louisiana, in August, 1929, has opened an office in Washington, D.C., at 1731 I St., N.W., and is engaged in perfecting its organization set-up. C. O. Moser, of Dallas, Texas, president and general manager of the American Cotton Growers Exchange, is president of the Council, and Robin Hood, is Acting Secretary.

At the last session, the New York State Legislature passed a bill authorizing plans for the construction of a new building for the Department of Agricultural Economics at Cornell University, and included an initial appropriation of $100,000 for plans and foundation. The total cost of the building authorized will be approximately $650,000. This new building will provide much needed space for the development of research, teaching and extension work in this Department. It is hoped that the building will be ready for occupancy in the fall of 1932.

W. G. Meal of the Division of Cooperative Marketing, Federal Farm Board, R. W. Cox of the Department of Agricultural Economics, University of Minnesota, and C. G. McBride, Department of Farm Economics, Ohio State University completed the requirements for the degree of Ph.D. at Cornell in June, 1930.

The following are serving as part-time research assistants in Agricultural Economics at the University of California during the present year:

H. J. Emery, a graduate of the University of Maine, who has been teaching fellow in Agricultural Economics and Rural Sociology at Oregon State College for the past two years. Mr. Emery has a Master's degree from that institution.

Eric Kraemer, who received the Ph.D. degree at Hamburg University, Germany, and last year was a research fellow at the Brookings Institution of Washington, D.C.

B. F. Lucas, a graduate of Cornell University, who served last year as research fellow in Agricultural Marketing at the University of Tennessee.

L. D. Mallory, who has the Bachelor's and Master's degree from the University of British Columbia, and who did graduate work at the University of California last year.

Omer Mills, an alumnus of State College of Agriculture, South Dakota, who, for the past two years, has been doing graduate work at the University of California.

James Poole, a former employee in the Civil Service of Great Britain and a graduate of Manitoba Agricultural College.

J. N. Tate, a graduate of Texas Agricultural College, who has been employed by that institution in Farm Management Research for the past four years.

Robert Tootell, a graduate of Montana Agricultural College, who was employed last year as an assistant in Agricultural Economics at that institution.

Farm organization and financial records on 700 farms in Indiana for the year 1929 have been closed and summarized and returned to the farmers by the Department of Farm Management and Rural Economics at Purdue University.

Mr. C. Arnold Anderson, of the University of Minnesota, has been appointed research assistant to Professor Pitirim Sorokin at Harvard University. Mr. Anderson has been a Social Science Research Council fellow at Harvard during the past year.

Dr. Fritz Bachmann, of Geneva, Switzerland, who has been working at Harvard University on the Swiss section of the project on International Agricultural and Population Statistics, has returned to his work in Switzerland.

Dr. Walter Bauer of the Giannini Foundation, University of California, is spending some time in Washington, D.C., on studies of legislative measures in foreign countries designed to aid agriculture.

Professor M. R. Benedict has resigned from his position as Chief of the Division of Agricultural Economics in the South Dakota Agricultural College to become associated with Professor J. D. Black in the teaching and research program of Harvard University in the field of Agricultural Economics. Professor Sherman Johnson, who has been studying at Harvard University during the past year, has been appointed chief of the division at South Dakota.

Dr. John D. Black, of Harvard University, gave a series of talks on Agricultural Reform at the summer sessions at Orangeburg, S.C., at Nashville, Tenn., and at Prairie View, Tex.

Mr. Fred J. Blair, for 27 years a member of the crop estimating staff in the United States Department of Agriculture and for 16 years in charge of reports on truck and canning crops, retired from the service on July 31.

Mr. Cecil J. Borum, formerly Assistant Agricultural Statistician for Indiana, has been appointed Agricultural Statistician in charge of the State office at Brookings, S.D., replacing Mr. J. L. Orr, who has been transferred to Washington, D.C.

Mr. Delmar D. Brubaker is now connected with the Federal Farm Board, as an expert in cooperative organization. He is a graduate of Carleton College, Northfield, Minn., and was formerly office manager for the Twin City Milk Producers, of St. Paul, Minn.

Mr. F. W. Brumley of the University of Florida is at Cornell University where he will continue his graduate work during the coming year.

Mr. G. B. Byers, recently assistant in Farm Organization and Management at the University of Illinois, has accepted an appointment in the Department of Farm Economics, University of Kentucky.

Dr. M. P. Catherwood, who studied at Northwestern University, Evanston, Ill., during the summer returned to Cornell to accept a position as Assistant Professor of Business Management in the Department of Agricultural Economics and Farm Management.

Mr. Manley J. Champlin, Senior Professor of Field Husbandry, University of Saskatchewan, is on sabbatic leave studying agricultural economics at the University of California.

Mr. A. K. Chiu left Harvard University in July to return to China to take charge of the research in Agricultural Economics of the Chinese Institution of Social Science Research.

Mr. Byron C. Denny, a graduate of Pennsylvania State College, has joined the staff of the New Jersey Agricultural Experiment Station, and will devote his time to studying agricultural operation in New Jersey, in conjunction with the Federal Farm Board.

Mr. D. C. Dvoracek, Extension Agent in Marketing, University of Minnesota, spent the summer working on the land economic survey being made by the Minnesota Conservation Commission.

Miss Martha Epps, who has been doing research work with Professor Fred R. Fairchild of the Forest Taxation Inquiry, New Haven, Conn., has resigned in order to undertake research work in Agricultural Economics at Harvard University.

Mr. Morris Evans, Associate Professor of Agricultural Economics, Kansas State Agricultural College, has been granted leave of absence for graduate study during the academic year 1930-31.

Mr. J. Wm. Fanning, who received the master's degree in agriculture at the University of Georgia in 1928, has been employed by the University as an extension statistician to work in cooperation with the Georgia office of the Division of Crop and Livestock Estimates, Bureau of Agricultural Economics.

Mr. Olin M. Farrington, who was a graduate assistant at the Oklahoma A. & M. College last year, has joined the staff of the Department of Markets and Rural Finance at the University of Kentucky, as Research Assistant in Marketing.

Professor H. C. Filley has resumed his duties at the University of Nebraska, after a year of graduate study at the Universities of Minnesota and Chicago.

Mr. John R. Gauss, who was an assistant in the Department of Agricultural Economics, Pennsylvania State College, during 1929-30, is making a survey of cooperatives in Pennsylvania for the Federal Farm Board.

Professor R. M. Green, Kansas State Agricultural College, is cooperating with the Federal Farm Board and the Bureau of Agricultural Economics in a study of wheat storage facilities in Kansas and other hard winter wheat states. The study will cover storage on farms, in local elevators, and at diversion points and terminals.

Mr. H. C. Grinnell, who last year did graduate work in the Department of Agricultural Economics and Farm Management, Cornell University, has accepted a position at the University of Vermont.

Mr. Marvin Guin is Assistant Professor in Agricultural Economics, Clemson Agricultural College, taking the place made vacant by the resignation of Mr. A. M. Carkuff. Mr. Guin did graduate work at Iowa State College during the past year.

Mr. Clarence Gunnells was appointed Assistant Agricultural Economist, Clemson Agricultural College, effective July 1, 1930, and will be engaged in farm management research.

Mr. Orville J. Hall has returned to his position at the University of Arkansas, after a year of graduate study at Harvard University.

Dr. Van B. Hart, in charge of economics extension work in New York State, is spending several months with the Extension Service, Department of Agriculture, assisting in the development of economic extension work in the Southern States.

Mr. Ernest J. Hopkins, formerly of Ohio State University, has been appointed Assistant Agricultural Economist at the Tennessee Agricultural Experiment Station, effective August 1.

Professor Charles B. Howe has been granted leave of absence from the New Jersey Agricultural Experiment Station for the year beginning October 1, to carry on work with the Federal Farm Board, at Washington, D.C.

Mr. Ray Hurley, who was graduated in Agricultural Economics from Pennsylvania State College in 1929, received the master's degree at the University of Maryland in June, 1930, and is now with the Bureau of the Census, at Washington, D.C.

Dr. J. B. Hutson, of the Bureau of Agricultural Economics, has been appointed a tobacco specialist in the Foreign Agricultural Service Division and sailed September 13 for work in Europe, with headquarters at Berlin. There he will make studies of foreign competition with and demand for tobacco grown in the United States. Other commodity specialists stationed abroad are W. I. Holt, cotton specialist, with headquarters at Havre, and F. A. Motz, fruit specialist, with headquarters in London.

Mr. D. B. Ibach, County Extension Agent in Atchison County, Missouri, has been appointed Agricultural Extension Specialist in Agricultural Economics, University of Missouri.

Mr. Fred C. Jans, county extension agent, Eads, Colorado, has been appointed Extension Economist in Farm Management Demonstrations, at the Colorado Agricultural College. This new work is intended to supplement the program which has been under the direction of Mr. T. H. Summers during the last eight years.

Mr. M. B. Johnson, North Dakota Agricultural Experiment Station, has taken charge of a project in ranch reorganization and land utilization, a cooperative project between the Station and the Bureau of Animal Industry and the Bureau of Agricultural Economics, U. S. Department of Agriculture. Mr. Johnson has recently completed a manuscript on "Ranch Organization and Management", which presents the results of a three-year study of ranch livestock farming in Montana, Wyoming, North Dakota, and South Dakota.

Mr. Neil W. Johnson, of the State College of Washington, has joined the staff of the Division of Farm Management and Costs, Bureau of Agricultural Economics. During the summer he studied the farm management aspects of bulk-handling of grain in Idaho, Oregon, and Washington.

Professor Henry Keller, Jr., returned to the New Jersey Agricultural College July 1, after a year's leave of absence for study at the University of Wisconsin and at Harvard University.

Dr. M. S. Kendrick of the Department of Agricultural Economics at Cornell spent the summer on a tax study for the Department of Agricultural Economics, Connecticut State Agricultural College, Storrs, Conn.

Mr. Dale Kieffer, a graduate of Michigan State Agricultural College, 1930, has accepted an appointment in the Department of Farm Organization and Management, University of Illinois, and will do graduate work in farm management.

Dr. Erich Kraemer, of Hamburg, Germany, who has been with the Institute of Economics, Washington, D.C., for the last year, has accepted a fellowship at the Giannini Foundation, Berkeley, California.

Mr. Constantine P. Ladas, a native of Macedonia, who has been working with Dr. John D. Black at Harvard University on the Greek and Rumanian sections of the project on International Agricultural and Population Statistics, has completed this section of the project and has left for California, where he will observe and study agricultural problems during the coming year.

Dr. C. E. Ladd, Director of Extension, New York State College of Agriculture, has been called to Washington for a six-month period of work with the Extension Service of the Department of Agriculture.

Mr. Harold C. Larsen, a graduate assistant at the Kansas State Agricultural College in 1929-30, received the master's degree recently and has been ap-

pointed to a fellowship at the University of Wisconsin for the academic year 1930-31.

Mr. Roger P. Matteson, formerly of the University of Wisconsin, has been appointed as research assistant in Agricultural Economics at the University of Tennessee, effective in July.

Mr. Robert McAlpin, formerly a research assistant in Agricultural Economics at the University of Tennessee and later a member of the faculty of Berry Junior College, in Georgia, died July 17, 1930.

Professor Bruce Melvin of Cornell University is spending his sabbatical year at Harvard University.

Mr. W. S. Middaugh has resigned from the Department of Agricultural Economics and Farm Management, Connecticut Agr. College, to accept a position with the Federal Farm Board to carry on a study of cooperative associations in Connecticut and Rhode Island.

Mr. George Montgomery, Assistant Professor of Agricultural Economics in Extension, has been promoted to the rank of Associate Professor in Agricultural Economics, Kansas State Agricultural College, and will have charge of the investigational and instructional work in marketing dairy products, fruits and vegetables.

Mr. W. P. Mortenson, Associate Professor of Agricultural Economics, Kansas State Agricultural College, resigned September 30 to accept a position at the University of Wisconsin.

Mr. Gordon B. Nance has been appointed Extension Specialist in Agricultural Economics at the University of Missouri, taking the place of Mr. H. C. Hensley.

Mr. R. Wayne Newton, Research Associate in Taxation at Michigan State College, resigned to become Director of Taxation for the Michigan State Farm Bureau.

Mr. R. I. Nowell left the Department of Farm Organization and Management, University of Illinois, in July to do statistical work with the Federal Farm Board.

Mr. A. R. Paden, a graduate student in Agricultural Economics at the Kansas State Agricultural College, has been appointed Assistant Marketing Specialist in the Bureau of Agricultural Economics, and reported for duty at Sioux City, Iowa, August 18, 1930.

Mr. O. A. Palmer, for several years a vocational teacher in Missouri, recently received the master's degree at the University of Missouri and has been appointed Research Assistant in Agricultural Economics at that institution.

Mr. Gifford Patch, Jr., Extension Specialist in Cooperative Organization at Michigan State College, has been on leave of absence to assist the Michigan Elevator Exchange in setting up local bean growers' associations to conform with the regulations of the Federal Farm Board.

Mr. A. M. Paxson who received the master's degree in Agricultural Economics at Pennsylvania State College in 1928, specializing in Rural Sociology, and who spent two years teaching sociology at the University of Tulsa, is now at Cornell University with Professor Dwight Sanderson, where he will continue his studies on part time.

Dr. George M. Peterson, formerly senior economist in the Section of Financial and Economic Research, U. S. Treasury Department, is now Associate Professor of Agricultural Economics on the Giannini Foundation, University of California. Just before coming to California Dr. Peterson spent two months at Harvard University working with Dr. Black on the Social Science Council reports on scope and method of research in the fields of taxation and land utilization.

Mr. H. B. Pingrey returned to his work at the Colorado State Agricultural College as assistant in Farm Management and Farm Organization, upon completion of work for the master's degree at the University of Minnesota last May.

Mr. R. E. Post, who has been Acting Head of the Department of Agricultural Economics at South Dakota State College for the last three years, has been promoted to the rank of Associate Professor.

Mr. J. O. Rankin of the University of Nebraska has collected data covering practically every transfer of farm land in seven counties of Nebraska from time of settlement to 1930.

Mr. Harry E. Rateliffe, until recently with the Bureau of Agricultural Economics, has joined the Department of Farm Management of the North Dakota Agricultural Experiment Station. His new work with consist of statistical analysis of price data and other material pertaining particularly to North Dakota.

Mr. Otis M. Reed, of Oklahoma A & M College, has been appointed a research assistant in Agricultural Economics at the University of Tennessee.

Mr. Ralph W. Rees has joined the staff of the Federal Farm Board as a marketing expert to work primarily with apple growers and their cooperative organizations. Mr. Rees has conducted studies of fruit conditions in New York State for Cornell University and was for four years manager of the operating department of the Western New York Fruit Growers Cooperative Packing Association. Since 1925 he has been connected with the New York Central Lines, during which period he visited fruit growing sections in the United States and Canada and studied their production and marketing problems.

Mr. Wayne Reitz, a graduate in Economics and Sociology, Colorado Agricultural College, 1930, has been appointed Farm Management Demonstrator for the year 1930-31, during the absence of Mr. T. H. Summers.

Mr. James L. Robinson has recently completed the requirements for the master's degree in Agricultural Economics at the University of Tennessee and has resumed his position with the Agricultural Extension Service of North Carolina.

Mr. Charles F. Sarle has been transferred from the Division of Crop and Livestock Estimates, Bureau of Agricultural Economics, to the Federal Farm Board, as Assistant Chief Economist, taking the place of Dr. Mordecai Ezekiel, who sailed early in September for a year of travel in Europe.

Dr. Leland Spencer of Cornell University has been granted six months leave beginning September 1 to accept an appointment with the Giannini Foundation of the University of California, where he will conduct a study of the fluid milk situation in and around Los Angeles. The producers and distributors of milk in this area have requested the Foundation to make the study with a view of developing facts and information needed in formulating price policies and determining methods for handling and controlling surpluses.

Mr. Gordon W. Sprague transferred from the Federal Farm Board to the Division of Dairy and Poultry Products, Bureau of Agricultural Economics, on July 16. He will have headquarters in Chicago and will have charge of new developments in market news service on poultry and eggs.

Mr. C. L. Spuller, who obtained the bachelor's degree at Purdue University in 1929 and has since been teaching vocational agriculture, joined the Department of Farm Management and Rural Economics at Purdue University in September as a teaching assistant.

Mr. T. H. Summers, Extension Economist in Farm Management Demonstrations, Colorado Agricultural College, left in September for a year of graduate study at the University of California. He holds a Social Science Research Council Fellowship.

Mr. Paul A. Taylor, a graduate of the University of Arkansas in 1929, is an assistant in Agricultural Economics at Alabama Polytechnic Institute this year.

Mr. Porter R. Taylor, formerly Director of Markets, State of Pennsylvania, has joined the staff of the Federal Farm Board as a Principal Marketing Specialist attached to the Division of Cooperative Marketing.

Dr. F. M. Thrun has been appointed Research Associate in Economics, Michigan State College. He will carry on studies in rural taxation, and will have charge of the instruction in the courses in land economics. Last year Dr. Thrun was on the staff of the College of William and Mary, Williamsburg, Va.

Dr. James M. Tinley, formerly employed by the Department of Agriculture, Union of South Africa, assumed his duties on July 1 with the Division of Agricultural Economics and the Giannini Foundation at the University of California where he is engaged primarily in research on marketing. Dr. Tinley spent two and one half years as a graduate student in Agricultural Economics at the University of Minnesota and nine months with the Division of Cooperative Marketing then in the Bureau of Agricultural Economics.

Mr. W. W. Underwood, Assistant Director of Extension in Washington from 1925 to 1929, began work August 1 in marketing extension at Purdue University. Mr. Underwood spent last year at the University of Minnesota in graduate study of marketing problems.

Mr. Grover Warmbrod, recently with the Jersey Cattle Advanced Registry Association, has been appointed a research assistant in Agricultural Economics at the University of Tennessee.

Mr. F. P. Weaver is again in charge of the Department of Agricultural Economics at Pennsylvania State College. He received the degree of Doctor of Philosophy at Cornell University in 1930.

Mr. P. K. Whelpton of the Scripps Foundation for Research on Population Problems will be in Mexico from June to October to continue a study of certain population and agricultural problems of Latin America.

Mr. T. E. Wilkins, a graduate of Colorado Agricultural College in July, has accepted an appointment in the Department of Farm Organization and Farm Management, University of Illinois, and will do graduate work in Farm Management.

Mr. Leslie Wright has returned to the Department of Farm Organization and Farm Management, University of Illinois, after nine months with the Department of Farm Economics, University of Kentucky.

Dr. E. C. Young conducted a three-weeks' "intensive unit" course in Advanced Farm Management in the summer session at Purdue University. Nine teachers of vocational agriculture in Indiana and Illinois and three members of the Purdue faculty were enrolled in the course, taking it for graduate credit.

Mr. H. N. Young has accepted a position in the Department of Agricultural Economics of the Virginia Polytechnic Institute, Blacksburg, Va., for the coming year.

Carl Zimmerman and his wife sailed from San Francisco August 22 for Siam where he will conduct a special study. They will return by way of Europe completing the trip around the world and returning to the University of Minnesota next fall.

TENTATIVE PROGRAM FOR AMERICAN FARM ECONOMIC ASSOCIATION MEETING

The following titles indicate the nature of the program of the American Farm Economic Association to be held in Cleveland, December 29, 30, and 31, 1930. The titles are given without the names of the participants although quite a number of those requested to take part in the program have already agreed to accept the responsibility of the papers requested of them. A number of the members of the Association have agreed that it would be a good plan to eliminate the formal discussion of papers and to place more emphasis on floor discussion. The cooperation of the membership is requested in giving a thorough trial to floor discussion following principal papers.

The titles of papers are given below without complete arrangement as to the time at which they will appear on the program.

Joint session with the American Economic Association.

The Program of the Farm Board—Representative of the Farm Board.

Problems Arising from Competition in Producing and Selling Specific Agricultural Products—Two papers.

Pertinent Aspects of Cooperation Following the Advent of the Farm Board.

Joint luncheon with the Rural Sociology group.

A Social and Economic Program for Submarginal Areas—Papers by a representative of each group.

Joint session with the Statistical Association.

Climatic Crop Surpluses and Deficits.

The Use of Agricultural Census Data.

Other titles not assigned.

Additional topics to be selected:

Marketing Round Table—Devoted to papers on transportation.

Farm Management Round Table—Devoted to farm management extension.

Other topics:

National Land Policies in Retrospect and Prospect.

State Policies in Regulating Land Settlements.

National Reclamation Policy in the Pacific States.

National Policy on the Public Domains.

Elements of Success in Cooperative Buying.

Elements of Success in Cooperative Selling.

Intermediate and Short Time Credit Needs.

The Integration of Research and Extension.

What Agricultural Products Had We Best Import?

What Agricultural Products Had We Best Export?

A Long Time Outlook as to Supply and Demand for Agricultural Products.

Farm Management Responsibilities and Opportunities.

Economic Aspects of Large-Scale Farming in the Wheat Belt.

Economic Aspects of Large-Scale Farming in the Corn Belt.

The Place of Farm Accounting in Research.

The Place of Farm Accounting in Extension.

Meeting the Farmers' Problems of Farm Reorganization.

The Farm Budget.

A few of these topics are subject to revision and others will be added to the list.

NEW MEMBERS

ARKANSAS POLYTECHNIC COLLEGE, Russellville, Ark.
BAUER, WALTER, c/o Asher Hobson, Bureau of Agrl. Econ., Washington, D.C.
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